



REPORT OF OCTOBER 2014 VAPOR INTRUSION MONITORING

CTS OF ASHEVILLE, INC. SUPERFUND SITE

**235 Mills Gap Road
Asheville, Buncombe County, North Carolina
EPA ID: NCD003149556
CERCLA Docket No. CERCLA-04-2012-3762**

Prepared for:

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Prepared by:

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Amec Project 6252-12-0006

December 19, 2014

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**Subject: Report of October 2014 Vapor Intrusion Monitoring
CTS of Asheville, Inc. Superfund Site
235 Mills Gap Road, Asheville, Buncombe County, North Carolina
EPA ID: NCD003149556
CERCLA Docket No. CERCLA-04-2012-3762
Amec Project 6252-12-0006**

Dear Ms. Urquhart-Foster:

Please find attached the Report of October 2014 Vapor Intrusion Monitoring (VI Report) for the above-referenced Site. Amec Environment & Infrastructure, Inc. prepared this VI Report on behalf of CTS Corporation pursuant to the requirement set forth in Section 1.3.4 of the Scope of Work contained in Appendix A of the Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study between the United States Environmental Protection Agency (USEPA) Region 4 and CTS Corporation (effective date of January 26, 2012), and in accordance with the Supplement to Vapor Intrusion Assessment Work Plan, Revision 4, dated June 11, 2014, which was conditionally approved by the USEPA in a letter dated June 13, 2014. The schedule and sampling locations for this monitoring event were described in the Springs Removal Action Work Plan, dated September 2, 2014, which was approved with modifications by USEPA on September 9, 2014.

If you have questions regarding this VI Report, please contact us at (828) 252-8130.

Sincerely,

Amec Environment & Infrastructure, Inc.


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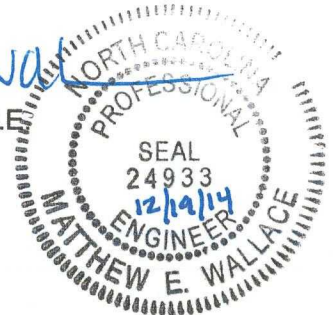


TABLE OF CONTENTS

List of Tables	ii
List of Figures	ii
List of Appendices	ii
List of Acronyms	ii
EXECUTIVE SUMMARY	I
1.0 INTRODUCTION.....	1
1.1 Site Description	1
1.2 Site Operational History	1
1.3 Previous Environmental Investigations	2
1.3.1 December 2007 and August 2008 Air Sampling	3
1.3.2 October 2012 Air Sampling	4
1.3.3 April 2014 Air Sampling	4
1.3.4 June 2014 Air Sampling	5
1.4 Objective of the Vapor Intrusion Monitoring	6
2.0 VAPOR INTRUSION MONITORING ACTIVITIES.....	7
2.1 Sampling Activities	7
2.1.1 Access to Sample Off-Site Properties	7
2.1.2 Crawlspace and Indoor Sample Locations	7
2.1.3 Ambient Air Sample Locations	9
2.1.4 Sample Collection	9
2.2 Analysis of Air Samples	10
3.0 ANALYTICAL RESULTS AND DATA USABILITY.....	11
3.1 Data Validation	11
3.2 Data Usability Summary	12
4.0 INDOOR AIR SCREENING LEVEL RISK EVALUATION.....	13
4.1 Exposure Assessment	13
4.2 Toxicity Assessment	14
4.3 Risk Characterization	15
4.4 Uncertainty Analysis	16
4.5 Comparison to Previous Air Investigations	17
5.0 DISCUSSION AND CONCLUSIONS.....	18
6.0 REFERENCES.....	20

LIST OF TABLES

- 1 Summary of Air Samples and Sampling Conditions – October 2014
- 2 Summary of October 2014 and Historical Laboratory Analytical Results with Risk Assessment Evaluation Summary

LIST OF FIGURES

- 1 Topographic Site Map
- 2 Site Map
- 3 October 2014 and Historical Air Sample Locations

LIST OF APPENDICES

- A Photographs of Sampling Activities
- B Logbook and Field Data Records
- C Laboratory Individual Certification Documents
- D Laboratory Analytical Report
- E Data Validation Report
- F Risk Assessment Calculation Tables

LIST OF ACRONYMS

Amec	Amec Environment & Infrastructure, Inc.
cis-1,2-DCE	cis-1,2-dichloroethene
COPC	constituent of potential concern
HI	Hazard Index
IRIS	Integrated Risk Information System
MDL	method detection limit
µg/m ³	micrograms per cubic meter
MGRA	Mills Gap Road Associates
NHL	non-Hodgkin lymphoma
PID	photoionization detector
RfC	reference concentration
RSL	Regional Screening Level
SIM	selective ion monitoring
trans-1,2-DCE	trans-1,2-dichloroethene
TCE	trichloroethene (also, trichloroethylene)
USEPA	United States Environmental Protection Agency
VI	vapor intrusion
VISL	Vapor Intrusion Screening Level
VOC	volatile organic compound

EXECUTIVE SUMMARY

Amec Environment & Infrastructure, Inc. (Amec), on behalf of CTS Corporation, has prepared this Report of October 2014 Vapor Intrusion Monitoring (VI Report) for the CTS of Asheville, Inc. Superfund Site (Site). This VI Report describes work conducted in accordance with the Supplement to Vapor Intrusion Assessment Work Plan, Revision 4 (VI Work Plan), dated June 11, 2014 (Amec, 2014), which was conditionally-approved by the United States Environmental Protection Agency (USEPA) in a letter dated June 13, 2014. The schedule and sampling locations for this monitoring event were described in the Springs Removal Action Work Plan, dated September 2, 2014, which was approved with modifications by USEPA on September 9, 2014. The vapor intrusion monitoring was conducted pursuant to Section 1.3.4 of the Scope of Work contained in Appendix A of the Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study (Settlement Agreement) between the USEPA and CTS Corporation (effective date January 26, 2012). This VI Report describes the activities that were undertaken to monitor vapor intrusion at residences located east of the Site.

The objective of this VI monitoring was to monitor site-related volatile organic compounds (VOCs) at residences located east of the Site. In its letter of August 19, 2014, USEPA requested quarterly air sampling for at least one year at residences east of the Site where air sampling was conducted in June 2014. The detected analytes were compared to risk-based screening values to determine the potential for the occurrence of vapor intrusion to pose a potential risk to the residential receptors.

Previous investigations have identified VOCs at the Site, primarily trichloroethene (TCE). The TCE groundwater plume generally extends from the area of the former facility to areas east and west of the Site, coincident with the direction of shallow groundwater flow. Groundwater discharge zones are located east and west of the Site at seeps and springs. Unnamed tributaries form at these seep/spring areas and flow topographically away from those areas.

The Supplemental VI Work Plan described the collection of indoor and crawlspace air samples at six residences located east of the Site. Ambient air samples were collected between the seep/spring area and the indoor/crawlspace sample locations, as well as between the seep/spring area and additional surrounding residences. The air samples were submitted for Site-specific VOCs according to USEPA Method TO-15 SIM (selective ion monitoring).

Indoor air samples were not collected as planned at two residences (one at the request of the resident and the other due to USEPA being unable to contact the resident). However, the detected constituents in the corresponding crawlspace samples were less than the USEPA RSLs for residential air. The data collected for the monitoring are considered 100 percent complete and usable for meeting the objectives presented in the VI Work Plan and the Supplemental VI Work Plan.

Concentrations of TCE and cis-1,2-dichloroethene were detected in the collected air samples. Estimated concentrations (i.e., above the method detection limit, but below the laboratory reporting limit) of trans-1,2-dichloroethene and vinyl chloride were detected in several air samples. Concentrations of detected constituents during this VI monitoring are

less than those constituent concentrations detected during previous sampling events conducted by USEPA and Amec.

Concentrations of the four detected volatile compounds were compared to USEPA risk-based screening levels for residential indoor air. Only TCE had detections that exceeded the screening concentrations and was thus selected as the focus of the risk evaluation. Risk calculations were completed using the detected indoor air concentrations of TCE by comparing these concentrations to inhalation toxicity benchmarks. The estimated incremental risk from indoor air for child residents ranges from 9×10^{-8} to 2×10^{-7} . The estimated incremental risk from indoor air for adult/child residents ranges from 3×10^{-7} to 5×10^{-7} . The estimated hazard index (HI) for TCE in indoor air is 0.1 for both residential adults and children.

The estimated HIs and incremental risks do not indicate unacceptable risk or hazards for residential receptors potentially exposed via indoor air vapor. The detected concentrations in crawlspace and ambient air do not exceed the screening values for risk evaluation. In addition, the measured air concentrations are within the national background indoor air concentrations.

In accordance with the USEPA-approved Springs Removal Action Work Plan, dated September 2, 2014, the next quarterly VI monitoring event will be conducted in January 2015.

1.0 INTRODUCTION

Amec Environment & Infrastructure, Inc. (Amec), on behalf of CTS Corporation, has prepared this Report of October 2014 Vapor Intrusion Monitoring (VI Report) for the CTS of Asheville, Inc. Superfund Site (Site). This VI Report describes work conducted in accordance with the Supplement to Vapor Intrusion Assessment Work Plan, Revision 4 (VI Work Plan), dated June 11, 2014 (Amec, 2014), which was conditionally approved by the United States Environmental Protection Agency (USEPA) in a letter dated June 13, 2014. The schedule and sampling locations for this monitoring event were described in the Springs Removal Action Work Plan, dated September 2, 2014, which was approved with modifications by USEPA on September 9, 2014. The vapor intrusion monitoring was conducted pursuant to Section 1.3.4 of the Scope of Work contained in Appendix A of the Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study (Settlement Agreement) between the USEPA and CTS Corporation (effective date January 26, 2012). This VI Report describes the activities that were undertaken to monitor vapor intrusion at residences located east of the Site.

1.1 SITE DESCRIPTION

The Site is approximately nine acres on Mills Gap Road in Asheville, Buncombe County, North Carolina and the areal extent of the contamination. The approximate center of the Site is located at north latitude 35°29'36" and west longitude 82°30'25" (Figure 1). The Site formerly contained an approximate 95,000-square foot, single-story brick and metal structure in the southern portion of the Site (Figure 2). The building was demolished in December 2011 and the concrete building pad remains intact. The northeastern portion of the Site contains an asphalt-paved parking area and asphalt-paved driveways are located parallel to the north (front) of the former building and southeast (rear) of the former building. A six-foot high chain-link fence surrounds the Site and a locked gate at the north end of the Site controls access to the Site from Mills Gap Road. The Site is unoccupied.

1.2 SITE OPERATIONAL HISTORY

International Resistance Company owned and operated a manufacturing facility at the Site from 1952 until 1959, when CTS of Asheville, Inc. purchased the real property, building, and equipment. CTS of Asheville, Inc. manufactured electronic components at

the facility from 1959 until April 1986. Arden Electroplating, Inc. leased a portion of the building from approximately December 1, 1985, until November 30, 1986, and the Site was conveyed to Mills Gap Road Associates (MGRA) on December 23, 1987. MGRA reportedly leased portions of the facility to various tenants, and otherwise utilized the building for business interests. The Site has been vacant/unoccupied since the mid-1990s.

Electronic components utilized in automotive parts and hearing aids were manufactured by CTS of Asheville, Inc. until plant operations ceased in April 1986. Small electronic components were electroplated with tin, nickel, zinc, and silver as one step in the process. Wastes generated from the process included sludge containing heavy metals and solvents. Solvents, including trichloroethene (TCE) and acetone, were used in the process to clean and/or degrease metal objects prior to electroplating.

Disposal/recycling activities at the facility prior to 1959 are unknown. From 1959 to 1986, solvents and metals were reportedly reclaimed whenever possible. Between 1959 and 1980, metal-bearing rinse waters and alkaline cleaners that could not be reclaimed from the electroplating process were reportedly disposed of through the municipal sewer system, while concentrated metals and solvent wastes were placed in drums for off-site disposal/recycling. After 1980, wastes were accumulated in drums on-site prior to off-site disposal or recycling.

1.3 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Environmental investigations have been conducted at the Site by several entities since 1987. The results of previous investigations have been described in other Site documents, and will be presented in the Remedial Investigation/Feasibility Study Work Plan to be prepared for the Site. The results of previous investigations have identified volatile organic compounds (VOCs), primarily TCE, at the Site.

Although the shallow/overburden TCE groundwater plume has not been completely delineated, the plume is expected to terminate near or slightly beyond the seep/spring areas east and west of the Site. Volatilization of TCE and degradation products from the groundwater plume represents a potential pathway for vapor intrusion into residential

structures located in the vicinity of the groundwater plume. The surface waters that emanate from the springs east and west of the Site contain TCE; therefore the volatilization of TCE from the surface waters is a potential pathway affecting ambient air in the vicinity of the surface waters.

Soil contamination associated with the Site has not been identified on adjacent properties; therefore, volatilization of constituents from soil contamination is not expected to contribute to vapor intrusion into residences located adjacent to the Site property. As summarized in Section 1.3.1 below, air sampling has been conducted in the vicinity of the Site and has included sampling of soil gas, crawlspace air, indoor air and ambient/outside air.

1.3.1 December 2007 and August 2008 Air Sampling

The USEPA and their contractors conducted air sampling in the vicinity of the Site in December 2007. The sampling included 10 subslab and 12 crawlspace air samples collected from 22 residences, as well as ambient air and 'slam bar' soil gas samples (T N & Associates, 2008).

A Trace Atmospheric Gas Analyzer (TAGA) was also used to screen air quality in the vicinity of the Site. TCE was detected in crawlspace air samples collected at residences located on properties adjacent to the Site at concentrations ranging from an estimated concentration of 0.243 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) at (b)(6)

(b)(6) (east of Site). Concentrations of detected constituents in the subslab and crawlspace air samples were not above USEPA's stated removal action levels.

In August 2008, USEPA and their contractors collected five crawlspace air samples, two indoor air samples, and one soil gas sample (as well as ambient and duplicate air samples) from six residences in the area of the Site (T N & Associates, 2009). TCE was detected in crawlspace air samples collected at residences located on properties adjacent to the Site at concentrations ranging from an estimated concentration of $1.15 \mu\text{g}/\text{m}^3$ at (b)(6) (b)(6) (west of Site) to $7.41 \mu\text{g}/\text{m}^3$ at (b)(6) (east of Site).

Concentrations of detected constituents in the air samples were not above USEPA's stated removal action levels.

Ambient air samples were collected during the aforementioned sampling events. Concentrations of TCE detected in the ambient air samples were highest near the seep/spring areas. The concentration of TCE in the vicinity of the springs east of the Site during the August 2008 air sampling event was $1,490 \mu\text{g}/\text{m}^3$ and the concentration of TCE in the vicinity of the spring(s) west of the Site during the August 2008 air sampling event was $5.24 \mu\text{g}/\text{m}^3$ (T N & Associates, 2009). The concentrations of TCE detected in other ambient air samples decreased with distance from the seep/spring areas.

1.3.2 October 2012 Air Sampling

Section 1.3.4 of the Settlement Agreement Scope of Work requires an evaluation of vapor intrusion at residences immediately contiguous to the Site and/or proximate to the currently known groundwater plume. Air samples were collected at properties west of the Site in October 2012.

Concentrations of TCE, cis-1,2-dichloroethene (cis-1,2-DCE), and/or vinyl chloride were detected in the collected air samples. Concentrations of detected constituents were generally similar to or slightly less than constituent concentrations detected during previous sampling events conducted by USEPA and its contractors. A screening-level risk assessment was conducted using the detected TCE concentrations. The calculated Hazard Indices (HIs) and incremental risks did not indicate unacceptable risks or hazards for potential residential receptors.

1.3.3 April 2014 Air Sampling

Air samples were collected at properties east of the Site in April 2014. Concentrations of TCE and cis-1,2-DCE were detected in the collected air samples. Concentrations of trans-1,2-dichloroethene (trans-1,2-DCE) and vinyl chloride were estimated (i.e., above the method detection limit, but below the laboratory reporting limit) in several air samples. Concentrations of detected constituents during the April 2014 VI assessment were generally similar to (i.e., within the same order of magnitude) those constituent

concentrations detected during previous sampling events conducted by USEPA and its contractors.

Concentrations of TCE detected in the crawlspace and indoor air at (b)(6)

(b)(6) were similar to the associated ambient air samples. The indoor and crawlspace concentrations of TCE detected at (b)(6) detected in the associated adjacent ambient air samples. The cis-1,2-DCE to TCE ratio for the air samples collected at (b)(6) pattern than other air samples collected during the investigation, indicating a separate distinct source of TCE inside the (b)(6) concentrations in crawlspace and indoor air at (b)(6) the source is not considered to be ambient air in the vicinity of the residence and is not a result of vapor intrusion from the subsurface.

A screening-level risk assessment was conducted using the detected TCE concentrations. The calculated HIs and incremental risks indicated unacceptable risks or hazards for potential residential receptors.

1.3.4 June 2014 Air Sampling

In an email dated June 6, 2014, USEPA required additional air sampling at residences located further east of the Site based on the results of the April 2014 air sampling event. Air samples were collected from in and/or near seven residences east of the Site. Concentrations of TCE and cis-1,2-DCE were detected in the collected air samples. Estimated concentrations of trans-1,2-DCE and vinyl chloride were detected in several air samples. Concentrations of detected constituents were generally similar to those constituent concentrations detected during previous sampling events conducted by USEPA and its contractors. A screening-level risk assessment was conducted using the detected TCE concentrations. The calculated HIs and incremental risks did not indicate unacceptable risks or hazards for potential residential receptors.

1.4 OBJECTIVE OF THE VAPOR INTRUSION MONITORING

The objective of this October 2014 air sampling, as proposed in the Supplemental VI Work Plan and as directed by USEPA, was to monitor site-related VOCs at residences located east of the Site. In its letter of August 19, 2014, USEPA requested quarterly air sampling for at least one year at residences east of the Site where air sampling was conducted in June 2014. This monitoring event was performed to determine if concentrations of Site-related VOCs were present in indoor air and crawlspaces at the residences. The detected concentrations, if any, were compared to risk-based screening values to indicate the potential for the occurrence of vapor intrusion to pose a potential risk to the residential receptors.

2.0 VAPOR INTRUSION MONITORING ACTIVITIES

The VI monitoring was conducted in accordance with the USEPA-approved Supplemental VI Work Plan. The collected air samples were analyzed for TCE, which is the primary volatile constituent known to be present in groundwater associated with the Site, as well as compounds that are degradation products of TCE.

2.1 SAMPLING ACTIVITIES

Sampling activities were conducted on October 28 and 29, 2014. A USEPA contractor representative accompanied Amec during the sampling activities.

2.1.1 Access to Sample Off-Site Properties

Prior to the June 2014 sampling event, the USEPA provided access agreements to property owners where air samples were proposed to be collected prior to initiating the air sampling activities. The access agreements requested access for Amec and USEPA personnel to enter the subject property for collection of air samples. Access agreements were obtained from the owners of the following properties:



Property owners were notified by the USEPA of the date of the October 2014 sampling activities and USEPA coordinated a time for the sample deployment/retrieval date and time, where possible.

2.1.2 Crawlspace and Indoor Sample Locations

Prior to collecting interior air samples in June 2014, the interior of each residence to be sampled was surveyed to collect information about the structure (e.g., configuration, heating/cooling systems, etc.) and to assess factors that could influence the air sampling

results (e.g., products or chemicals containing VOCs). An Occupied Dwelling Questionnaire was completed in coordination with the occupant of the residence. The Questionnaires were included in the Report of June 2014 Vapor Intrusion Assessment, dated August 14, 2014.

Indoor and/or crawlspace air samples were collected from the following six residences, which are located east of the Site (Figure 3):

(b)(6)

(b)(6) is a one-story home with a basement. A portion of the basement is reportedly finished living space. The indoor air sample (IAS-10) was collected in the living room of the residence.

(b)(6) is a 1.5-story home with a partially finished walk-out basement. The indoor air sample (IAS-08) was collected in the living room of the residence, and a field duplicate sample (FD-10) was collected with IAS-08.

(b)(6) is a one-story mobile home with a crawlspace. The ground surface of the crawlspace is soil and gravel. There were no items being stored in the crawlspace during the sampling activities. The indoor air sample (IAS-07) was collected in the living room of the residence and the crawlspace air sample (CAS-07) was collected in the northern portion of the crawlspace.

(b)(6) is a one-story home with a crawlspace. The ground surface of the crawlspace is soil and is partially covered with a polyethylene moisture barrier. All-terrain vehicles, lawn mowing equipment, paint cans, and other miscellaneous items were being stored in the crawlspace during the sampling activities. The crawlspace

air sample (CAS-13) was collected in the southeastern portion of the crawlspace. An indoor air sample was not collected at the request of the tenant.

(b)(6) is a one-story home with a crawlspace. The USEPA was unable to contact the resident regarding collection of an indoor air sample at the residence. Therefore, USEPA requested that a crawlspace sample be collected. The crawlspace air sample (CAS-12) was collected in the eastern portion of the crawlspace. There were no items being stored in the crawlspace during the sampling activities.

(b)(6) is a one-story home with a crawlspace. The ground surface of the crawlspace is soil and is covered with a polyethylene moisture barrier. There were no items being stored in the crawlspace during the sampling activities. The indoor air sample (IAS-11) was collected in the living room of the residence and the crawlspace air sample (CAS-11) was collected in the southeastern portion of the crawlspace. A field duplicate sample (FD-11) was collected with CAS-11.

Photographs of the sample locations are provided in Appendix A.

2.1.3 Ambient Air Sample Locations

Seven ambient air samples (AAS-07 through AAS-14) were collected at locations between the sampled residences and the spring/seep area located east of the CTS property. A field duplicate sample (FD-09) was collected with AAS-14.

Photographs of the sample locations are provided in Appendix A.

2.1.4 Sample Collection

Air samples were collected using individually-certified, 6-Liter, electropolished, stainless steel (SUMMA[®]) canisters. The canisters were equipped with individually-certified flow controllers that were set to collect an air sample over a 24-hour period.

The indoor air sample canisters were placed on a plastic bucket on the floor surface for sample collection. The sample inlet height was approximately three feet above the floor surface.

The crawlspace air sample canisters were placed on the ground surface. The sample inlet height was approximately two feet above the ground surface.

The ambient air samples were secured to a fence post driven into the ground at the sample locations. The sample inlet height was between approximately four and five feet above ground surface.

Individually-certified vacuum gauges were attached to each canister and sample personnel recorded vacuum gauge readings at the beginning and end of sample collection. The air temperature also was recorded at the beginning and end of sample collection (for indoor and crawlspace air samples, the indoor/crawlspace temperature and ambient/outdoor temperature were both recorded). A calibrated photoionization detector was used to measure organic vapors in the vicinity of the sample canister during sample deployment and retrieval. Each canister was deployed for 24 hours, and a sample tag was affixed to the canisters prior to shipment to the laboratory.

Copies of the field data records and logbook for the sampling activities are included in Appendix B. Table 1 contains a summary of the air samples collected and quality assurance/quality control samples submitted to the laboratory. Copies of the laboratory certifications for the canisters, flow controllers, and vacuum gauges are included in Appendix C. The air samples were shipped under chain-of-custody protocol via overnight delivery to ALS Environmental in Simi Valley, California.

2.2 ANALYSIS OF AIR SAMPLES

The air samples were submitted for analysis of the following Site-related VOCs according to USEPA Method TO-15 SIM (selective ion monitoring):

- trichloroethene
- cis-1,2-dichloroethene
- trans-1,2-dichloroethene
- vinyl chloride

3.0 ANALYTICAL RESULTS AND DATA USABILITY

The following sections describe the laboratory analytical results of the submitted air samples, as well as the results of data validation and data usability. The laboratory analytical report is included as Appendix D.

The indoor air samples collected at (b)(6) by the laboratory until the preliminary analytical results (i.e., not validated) of the associated crawlspace samples were received. USEPA indicated that if the TCE concentrations in the crawlspace samples were greater than $1 \mu\text{g}/\text{m}^3$, then the associated indoor air sample was to be analyzed. The reported concentrations of TCE in the two crawlspace samples were reported as less than $1 \mu\text{g}/\text{m}^3$; therefore, the associated indoor air samples were not analyzed.

A summary of the analytical results is presented in Table 2. TCE was detected at concentrations ranging from 0.052 to $0.11 \mu\text{g}/\text{m}^3$ in the crawlspace air samples; 0.13 to $0.22 \mu\text{g}/\text{m}^3$ in the indoor air samples; and 0.061 (estimated) to $0.11 \mu\text{g}/\text{m}^3$ in the ambient air samples. Concentrations of cis-1,2-DCE were detected in the indoor air, crawlspace air, and ambient air samples at concentrations ranging from 0.044 to $1.2 \mu\text{g}/\text{m}^3$. Estimated concentrations (i.e. above the method detection limit but less than the laboratory reporting limits) of trans-1,2-DCE and vinyl chloride were detected in several air samples.

3.1 DATA VALIDATION

Data validation was conducted based on procedures in the USEPA Region 4 Data Validation Standard Operating Procedures for Organic Analysis (USEPA, 2008), in conjunction with Method TO-15 SIM and the laboratory's Method TO-15 standard operating procedure. Full validation, including raw data verification and calculation checks, was completed on the laboratory data.

The data validation narrative is included in Appendix E. The results of the data validation did not indicate the presence of quality control issues.

3.2 DATA USABILITY SUMMARY

Data quality issues were not identified during the data validation process. Data gaps from the investigation include:

- An indoor air sample was not collected at (b)(6) resident.
- An indoor air sample was not collected at (b)(6) USEPA, a crawlspace sample was alternatively collected.

The identified data gaps were out of the control of Amec, the Respondent, or USEPA (i.e., unable to contact resident and request to sample at a later time) and will be addressed during the next quarterly monitoring event. The data set is considered to be 100 percent complete with respect to the collected data. Therefore, the data are usable for completing the objectives set forth in the Supplemental VI Work Plan.

4.0 INDOOR AIR SCREENING LEVEL RISK EVALUATION

Amec evaluated air quality for residences located east of the Site as directed by USEPA. Indoor air and/or crawlspace air samples were collected on October 29, 2014, at six residences, and ambient air samples were collected from seven locations (Figure 3). With the exception of the crawlspace air sample collected at (b)(6) concentrations of TCE were detected above the laboratory reporting limits in each of the air samples. Concentrations of cis-1,2-DCE were detected above the laboratory reporting limits in each of the air samples and estimated concentrations of trans-1,2-DCE and vinyl chloride were detected in several air samples. The analytical data for the October 2014 air samples are summarized in Table 2. Risk assessment tables are included in Appendix F.

4.1 EXPOSURE ASSESSMENT

In order to identify constituents of potential concern (COPCs) for the air pathway, the detected air constituents were compared to target indoor air concentrations from the USEPA's Vapor Intrusion Screening Level (VISL) Calculator, Version 3.3.1 (USEPA, 2014a) and the USEPA Regional Screening Levels (RSLs) for residential air (USEPA, 2014b). These screening levels are presented in Table F.1 and are based on a residential exposure scenario with target carcinogenic risk of 1×10^{-6} and target hazard index of 0.1. As a result of this screening step, TCE was identified as an indoor air COPC and carried through the screening-level risk evaluation. The detected concentrations of vinyl chloride were below the Target Residential Indoor VISLs/RSLs and were not carried through the screening-level risk evaluation. There are no air screening criteria for 1,2-cis-DCE and 1,2-trans-DCE.

Incremental risks and hazards were calculated using default adult and child resident exposure assumptions (Tables F.2 through F.5). The risk assessment assumes future residents will be present 350 days a year with exposure durations of 26 years for a residential adult (6 years as a child and 20 years as an adult for age-adjusted exposures) and 6 years for residential children (USEPA, 1991; USEPA, 2014c).

4.2 TOXICITY ASSESSMENT

TCE is a man-made, colorless liquid used mainly as a solvent to remove grease from metal parts. It has also been an ingredient in some consumer products such as typewriter correction fluid, adhesives, spot removers, carpet cleaners, paint strippers/removers (USEPA, 2014d), and spray fixatives (USEPA, 2014e). The possible health effects from breathing TCE depend on the levels in indoor air, the length of exposure, and whether and when a pregnant woman is exposed. According to the USEPA, women who are in the first eight weeks of pregnancy are most sensitive to TCE exposures with exposures during this time potentially increasing the risk of heart malformations in a developing fetus (USEPA, 2012). Chronic exposure to TCE may affect the immune system and increase susceptibility to infections. Exposure to TCE is associated with an increased risk of cancers of the kidney, liver, and non-Hodgkin lymphoma (USEPA, 2011a).

Toxicity values [Inhalation Reference Concentrations (RfCs) and Inhalation Unit Risks (IURs)] used in this evaluation were obtained from the USEPA Integrated Risk Information System (IRIS) (USEPA, 2011a). IRIS has released a Toxicity Assessment for TCE that recommends TCE be addressed as a potential mutagen with risk for kidney-related impacts being assessed using age-specific adjustment factors, and with liver and non-Hodgkin lymphoma (NHL) risk addressed using the standard carcinogenic risk equations. Separate TCE IURs have been derived for the kidney and liver-NHL endpoints. These IURs, the age-specific adjustment factors used to adjust the exposure intakes, and the TCE RfC used in this assessment, are listed in Appendix F, Tables F.2 through F.5.

The RfC is used to estimate non-carcinogenic inhalation hazards. The RfC is an estimate of the daily exposure to the human population (including sensitive subgroups such as children and the elderly) that is likely to be without an appreciable risk of deleterious effects. The estimated hazard is compared to a target hazard index (HI) of 1. Cumulative hazards less than 1 are not likely to be associated with systemic or non-carcinogenic health risks. Non-carcinogenic hazards associated with inhalation exposures to TCE are associated with potential damage to the thymus and heart.

Using the endpoint-specific IURs for TCE, the cumulative carcinogenic risk for the indoor vapor intrusion pathway was calculated and compared to a target risk of 1×10^{-6} . If the

cumulative carcinogenic risk for residents is less than 1×10^{-6} , risk is considered to be in the acceptable range. The IUR is characterized as an upper-bound estimate designed to be protective of the majority of the human population.

4.3 RISK CHARACTERIZATION

Concentrations of TCE in the crawlspace samples collected from 18 (b)(6) were less than USEPA Region 4's "trigger" concentration of $1 \mu\text{g}/\text{m}^3$. Therefore, a risk evaluation was not conducted for these residences.

The TCE indoor air concentration from (b)(6) ($0.22 \mu\text{g}/\text{m}^3$) was used to assess potential indoor air exposures and calculate incremental risks and hazards for both adult/child and child residents (Tables F.2 and F.3, respectively). The estimated incremental risk from indoor air is 5×10^{-7} for residential adults/children and 2×10^{-7} for residential children. The estimated hazard indices (HIs) for TCE in indoor air are 0.1 for both residential adults and children. The estimated HIs are less than 1 and the estimated incremental risks are equal to or less than 1×10^{-6} . Based on these results, the air pathway would not pose an unacceptable hazard or risk to current or future residential receptors living at (b)(6).

The TCE indoor air concentration from (b)(6) ($0.14 \mu\text{g}/\text{m}^3$) was used to assess potential indoor air exposures and calculate incremental risks and hazards for both adult/child and child residents (Tables F.4 and F.5, respectively). The estimated incremental risk from indoor air is 3×10^{-7} for residential adults/children and 1×10^{-7} for residential children. The estimated HIs for TCE in indoor air are 0.1 for both residential adults and children. The estimated HIs are less than 1 and the estimated incremental risks are less than 1×10^{-6} . Based on these results, the air pathway would not pose an unacceptable hazard or risk to current or future residential receptors living at (b)(6).

(b)(6).

4.4 UNCERTAINTY ANALYSIS

The intent of this monitoring was to evaluate current Site-specific VOC concentrations in air inside and in the vicinity of residences and to compare current concentrations to previously measured concentrations of Site-specific VOCs. Conservative risk-based screening criteria were used to complete a preliminary evaluation of risks and hazards for the residents. Key uncertainties associated with an inhalation risk evaluation include the estimation of representative exposure concentrations and exposure intakes, the choice of toxicity values, and the approach to estimating risks (USEPA, 2009).

This assessment assumes that the air concentrations at the residences will remain consistent over time, although the detected constituents are potentially biodegradable and air concentrations typically vary due to weather/seasonal fluctuations that influence volatilization, air mixing, pressure differentials, etc. The assessment also assumes that the air concentrations at the sampled locations will be spatially uniform, although air concentrations may vary within structures due to locations of underground utilities, subsurface fill and/or moisture barriers, foundation cracks, air flow, and dilution and mixing within the indoor air space. These spatial and temporal variations could affect the risk estimates calculated.

The assessment assumes that the source of TCE is the groundwater plume. However, other man-made sources of TCE may be contributing to the concentrations observed in indoor air. As noted in Section 4.2, USEPA has determined that a variety of household products can contribute to observed indoor air TCE concentrations.

The assessment assumes that future residents will be present 350 days a year with exposure durations of 26 years for a residential adult (6 years as a child and 20 years as an adult for age-adjusted exposures) and 6 years for residential children. While consistent with current USEPA risk assessment guidance, these assumptions would tend to overestimate risks because national residential tenure in one location averages approximately 9 years (USEPA, 2011b).

The non-carcinogenic reference concentration for TCE is based on cardio-malformations for pre-birth exposures that might occur during the first eight weeks of pregnancy.

Otherwise, exposure limits could be 10-fold higher and still remain protective for the majority of the general public (USEPA, 2012). The possible health effects from breathing TCE depends on the levels in indoor air, the length of exposure, and whether and when a pregnant woman is exposed.

There is some degree of uncertainty associated with the characterization of risks of local residents because residential adults and children are assumed to be present in the residence for 24 hours per day for 350 days per year. Working adults and children attending day care or school would not be present continuously every day.

4.5 COMPARISON TO PREVIOUS AIR INVESTIGATIONS

Ambient, crawlspace, and/or indoor air samples were previously collected by USEPA contractors and Amec at the residences sampled during this VI monitoring. A summary of the analytical results from the previous sampling events, as well as this VI monitoring, are included in Table 2. Concentrations of TCE during this VI monitoring are less than constituent concentrations detected during previous sampling events.

5.0 DISCUSSION AND CONCLUSIONS

The VI monitoring was conducted in accordance with the USEPA-approved Supplemental VI Work Plan. Indoor air samples were not collected as planned at two residences (one at the request of the resident and the other due to USEPA being unable to contact the resident). However, the detected constituents in the corresponding crawlspace samples were less than the USEPA RSLs for residential indoor air. The data collected for this VI monitoring event are considered 100 percent complete and usable for meeting the objectives presented in the VI Supplemental Work Plan.

Concentrations of TCE and cis-1,2-DCE were detected in the collected air samples. Estimated concentrations (i.e., above the method detection limit, but below the laboratory reporting limit) of trans-1,2-DCE and vinyl chloride were detected in several air samples. Concentrations of detected constituents during this October 2014 VI monitoring are less than constituent concentrations detected during previous sampling events. Between September and October 2014, a removal action, consisting of installation of a Springs Vapor Removal and Capture System, was performed in the area of the springs. This removal action effectively reduced TCE and other constituent concentrations in air in the area east of the Site prior to this VI monitoring event.

The concentration of TCE detected in one indoor air sample was greater than the Target Residential Indoor VISL/RSL. As a result of this screening step, TCE was identified as an indoor air COPC and carried through the screening-level risk evaluation. The estimated concentrations of vinyl chloride were below the Target Residential Indoor VISLs/RSLs and were not carried through the screening-level risk evaluation. There are no inhalation VISL/RSL values issued for cis-1,2-DCE and trans-1,2-DCE. Risk calculations were completed using the detected air concentrations of TCE in indoor air samples and comparing these concentrations to inhalation toxicity benchmarks. Table 2 contains a summary of the risk and hazard estimates for the indoor air samples.

The TCE air concentrations measured in the ambient air and residential air samples (up to $0.22 \mu\text{g}/\text{m}^3$) are within the 1990 to 2005 national background indoor air concentrations range of 50th percentiles for TCE, which range from less than the reporting limit to $1.1 \mu\text{g}/\text{m}^3$ (USEPA, 2011c). The USEPA national background indoor air concentration data

were collected from homes not known or expected to be located over soil or groundwater contamination or those having effective vapor intrusion mitigation systems in place; therefore, the national background indoor air concentrations represent typical background indoor air concentrations. However, the national background indoor concentration data might not be directly applicable for the southeastern states due to the absence of USEPA Region 4 sampling locations in the study.

The estimated hazards and risks do not indicate unacceptable risk or hazards for residential receptors potentially exposed via indoor air. In accordance with the USEPA-approved Springs Removal Action Work Plan, dated September 2, 2014, the next quarterly VI monitoring event will be conducted in January 2015.

6.0 REFERENCES

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- USEPA, 2014d. Trichloroethylene (Technology Transfer Network-Air Toxics Website). <http://www.epa.gov/ttn/atw/hlthef/tri-ethy.html>, accessed June 12, 2014.

*CTS of Asheville, Inc. Superfund Site
Report of October 2014 Vapor Intrusion Monitoring
Amec Project 6252-12-0006
December 19, 2014*

USEPA, 2014e. TSCA Work Plan Chemical Risk Assessment, Trichloroethylene: Degreasing, Spot Cleaning and Arts & Crafts Uses. USEPA Document 740-R1-4002, June 2014.

TABLES

TABLE 1
Summary of Air Samples and Sampling Conditions - October 2014
CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Project 6252-12-0006

Sample ID	Sample Location/Address	Date Start	Time	Interior Air Temperature (°F)		Ambient Air Temperature (°F)		PID Reading (ppm)	PID Reading (ppm)	Vacuum (inches Hg)	
			Start/Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop
IAS-07	(b)(6)	10/28/2014	8:25	65	69	56	62	0.0	0.0	-27.2	-6.5
CAS-07		10/28/2014	8:40	52	57	57	58	0.0	0.0	-26.5	0.0
AAS-07		10/28/2014	8:58	NA	NA	52	58	0.0	0.0	-26.3	-0.2
AAS-14		10/28/2014	9:33	NA	NA	60	58	0.0	0.0	-25.8	-0.4
AAS-10		10/28/2014	10:17	NA	NA	63	57	0.0	0.0	-26.6	-3.9
IAS-10		10/28/2014	10:25	70	68	63	57	0.1	0.2	-26.8	-6.9
AAS-09		10/28/2014	10:39	NA	NA	66	60	0.0	0.0	-27.2	-0.8
AAS-08		10/28/2014	10:56	NA	NA	68	59	0.0	0.0	-26.3	-5.8
IAS-08		10/28/2014	11:17	78	70	70	62	0.0	0.1	-26.4	-2.5
AAS-13		10/28/2014	16:58	NA	NA	76	56	0.0	0.0	-26.6	-7.1
CAS-13		10/28/2014	17:08	67	60	76	56	0.0	0.0	-26.5	-0.1
CAS-11		10/28/2014	17:37	66	58	78	56	0.0	0.0	-27.0	-1.4
IAS-11		10/28/2014	17:47	75	65	77	56	0.0	0.0	-26.8	-0.1
AAS-12		10/28/2014	18:00	NA	NA	75	55	0.0	0.0	-24.8	-6.9
CAS-12		10/28/2014	18:11	65	55	75	55	0.0	0.0	-26.9	-7.8
FD-09 (AAS-14)		10/28/2014	9:33	NA	NA	60	58	0.0	0.0	-26.2	-5.6
FD-10 (IAS-08)		10/28/2014	11:17	78	70	70	62	0.0	0.1	-26.2	-7.0
FD-11 (CAS-11)		10/28/2014	17:37	66	58	78	56	0.0	0.0	-26.6	-3.4
TB-04		lab prep	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1. °F: degrees Fahrenheit
2. PID: photoionization detector
3. ppm: parts per million
4. Hg: mercury
5. NA: not applicable

Prepared By: SEK 10/30/14

Checked By: RMC 12/15/14

TABLE 2
Summary of October 2014 and Historical Laboratory Analytical Results with Risk Assessment Evaluation Summary
CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Project 6252-12-0006

AMBIENT AIR SAMPLES

Address	Date	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
(b)(6)	6/25/2014	AAS-07	0.49	0.18	<0.010	<0.011
(b)(6)	10/29/2014	AAS-07	0.11	0.37	<0.0081	0.012 J
(b)(6) (approximately same location as AAS-08)	8/7/2008	MG29-AMB	<0.358	<0.264	<0.264	<0.171
(b)(6)	6/25/2014	AAS-08	0.32	0.11	<0.011	<0.012
(b)(6)	10/29/2014	AAS-08	0.085	0.43	<0.010	0.015 J
(b)(6) (#2)	6/25/2014	AAS-09	0.30	0.10	<0.022	<0.024
(b)(6) (#2)	10/29/2014	AAS-09	0.066	0.50	<0.017	<0.018
(b)(6) (#1)	6/25/2014	AAS-10	0.74	0.25	<0.035	0.13 J
(b)(6) (#1)	10/29/2014	AAS-10	0.089	0.90	0.012 J	0.015 J
(b)(6) (approximately 30 feet east of AAS-12)	8/7/2008	MG10RE-AMB	0.983	<0.264	<0.264	<0.171
(b)(6)	6/25/2014	AAS-12	0.64	0.25	<0.023	<0.024
(b)(6)	10/29/2014	AAS-12	0.10	1.2	0.013 J	0.017 J
(b)(6) (approximately 120 feet north of AAS-13)	8/7/2008	MG28-AMB	<0.358	<0.264	<0.264	<0.171
(b)(6) (approximately 200 feet northeast of AAS-13)	8/7/2008	MG10OW-AMB	0.419	<0.264	<0.264	<0.171
(b)(6)	6/25/2014	AAS-13	0.42	0.14	<0.031	<0.033
(b)(6) (duplicate)	6/25/2014	FD-08 (AAS-13)	0.41	0.15	<0.031	0.048 J
(b)(6)	10/29/2014	AAS-13	0.087	0.80	<0.011	0.019 J
(b)(6) (approximately 175 feet northeast of AAS-14)	8/7/2008	MG46-AMB	<0.358	<0.264	<0.264	<0.171
(b)(6)	6/25/2014	AAS-14	0.57	0.20	0.024 J	0.025 J
(b)(6)	10/29/2014	AAS-14	0.061 J	0.56	<0.017	<0.018
(b)(6) (duplicate)	10/29/2014	FD-09 (AAS-14)	0.090	0.92	0.011 J	0.020 J

CRAWLSPACE AIR SAMPLES

Address	Date	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
(b)(6)	6/25/2014	CAS-07	0.34	0.099	<0.011	<0.012
(b)(6)	10/29/2014	CAS-07	0.11	0.26	<0.017	<0.018
(b)(6)	12/13/2007	MGSC10OW	2.130	0.424	<0.198	<0.128
(b)(6)	8/7/2008	MGSC10OW	0.380	<0.264	<0.264	<0.171
(b)(6)	6/25/2014	CAS-11	0.16	0.040 J	<0.016	<0.017
(b)(6) (duplicate)	6/25/2014	FD-07 (CAS-11)	0.16	0.042 J	<0.016	<0.017
(b)(6)	10/29/2014	CAS-11	0.052	0.41	<0.0082	<0.0092
(b)(6) (duplicate)	10/29/2014	FD-11 (CAS-11)	0.052	0.36	<0.0092	0.015 J
(b)(6)	12/13/2007	MGSC38	2.83	0.551	<0.198	<0.128
(b)(6)	8/7/2008	MGSC28	1.48	<0.264	<0.264	<0.171
(b)(6)	6/25/2014	CAS-13	0.25	0.078 J	<0.021	<0.022
(b)(6)	10/29/2014	CAS-13	<0.0092	0.044	<0.0082	<0.0087
(b)(6)	8/7/2008	MGSCRE	0.522	<0.264	<0.264	<0.171
(b)(6)	10/29/2014	CAS-12	0.066	0.60	<0.011	<0.012

TABLE 2
Summary of October 2014 and Historical Laboratory Analytical Results with Risk Assessment Evaluation Summary
CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Project 6252-12-0006

INDOOR AIR SAMPLES

Address	Date	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC	TCE Hazard Quotient*	TCE Cancer Risk (Adult)	TCE Cancer Risk (Child)
(b)(6)	8/7/2008	MGIA29	<0.358	<0.264	<0.264	<0.171			
	6/25/2014	IAS-08	0.21	0.060 J	<0.024	<0.026	0.1	5 E-07	1 E-07
	6/25/2014	FD-06 (IAS-08)	0.21	0.058 J	<0.024	<0.026	0.1	5 E-07	1 E-07
	10/29/2014	IAS-08	0.14	0.65	<0.0091	0.022 J	0.1	3 E-07	1 E-07
	10/29/2014	FD-10 (IAS-08)	0.13	0.64	<0.022	0.030 J	0.1	3 E-07	9 E-08
	6/25/2014	IAS-10	0.49	0.12	<0.011	<0.012	0.2	1 E-06	3 E-07
	10/29/2014	IAS-10	0.22	0.74	<0.022	0.038 J	0.1	5 E-07	2E-07

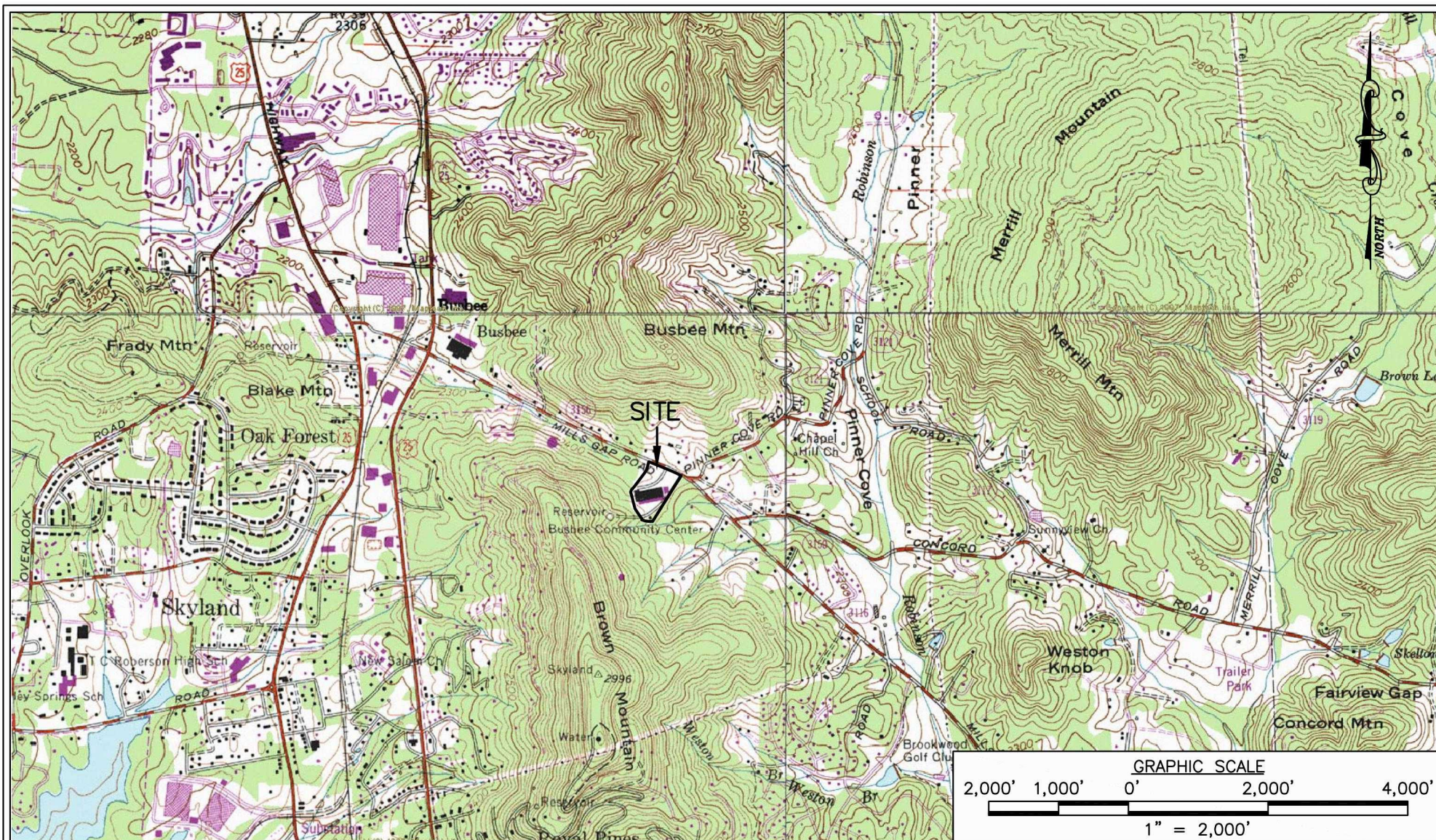
Notes:

- Concentrations are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
- TCE = trichloroethene; cis-1,2-DCE = cis-1,2-dichloroethene; trans-1,2-DCE = trans-1,2-dichloroethene; VC = vinyl chloride
- J - Concentration is estimated.
- '<' - Constituent not detected above the indicated method detection limit.
- * - for both adult and adult/child.
- The risk evaluation for the October 2014 data is based on the recommended default exposure values contained in OSWER Directive 9200.1-120, dated February 6, 2014.
- The risk evaluation did not include historical sample results, as the historical samples were collected prior to the current USEPA risk assessment guidance.

Prepared By: SEK 11/17/14

Checked By: RMC 12/15/14

FIGURES

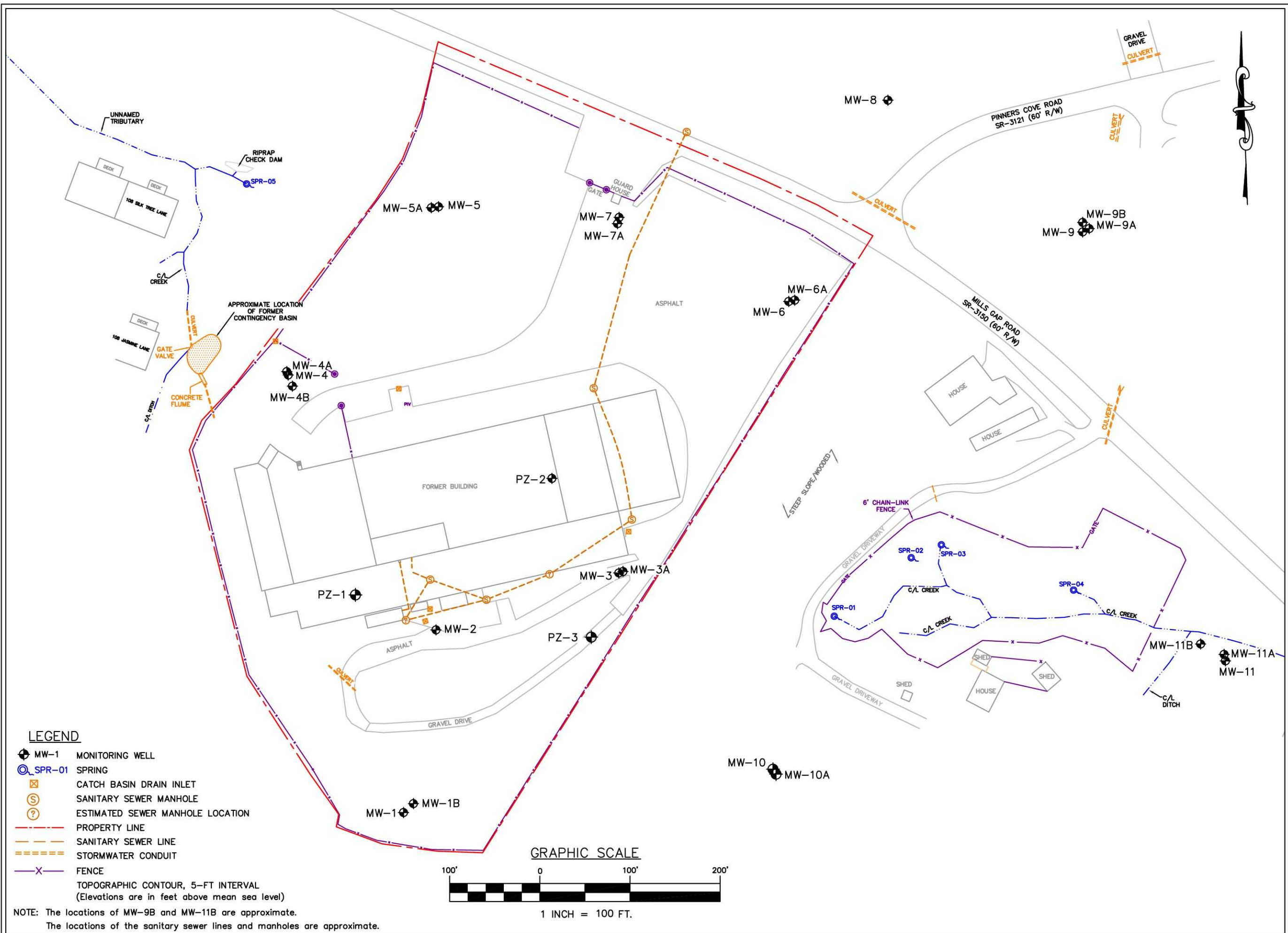


TOPOGRAPHIC SITE LOCATION MAP
 CTS OF ASHEVILLE, INC. SUPERFUND SITE
 ASHEVILLE, NORTH CAROLINA



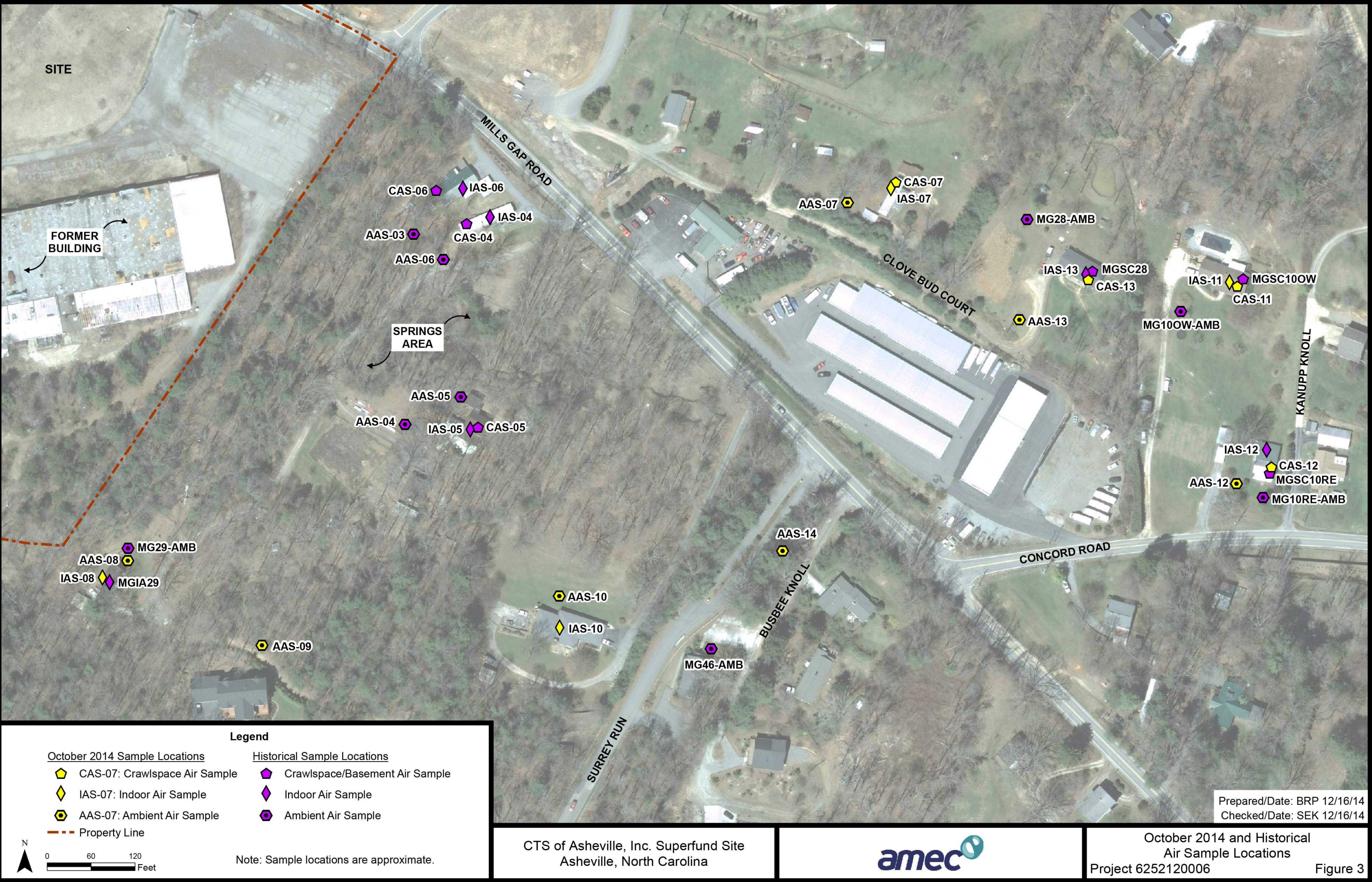
DRAWN: SEK	ENG CHECK: --	DATE: AUGUST 2014	PROJECT: 6252-12-0006
DFT CHECK: MEW	APPROVAL: MEW	SCALE: 1" = 2,000'	FIGURE: 1

REFERENCE: USGS QUADRANGLES: ASHEVILLE (1961), OTEEN (1962), FRUITLAND (1978) AND SKYLAND (1978)



SITE MAP
CTS OF ASHEVILLE, INC. SUPERFUND SITE
ASHEVILLE, NORTH CAROLINA

DRAWN: SEK	ENG CHECK: --	DATE: AUGUST 2014	JOB: 6252-12-0006
DFT CHECK: MEW	APPROVAL: MEW	SCALE: 1"=100'	FIG: 2
REFERENCE: SURVEY PREPARED BY FREELAND & ASSOCIATES.			



APPENDIX A

PHOTOGRAPHS OF SAMPLING ACTIVITIES



Photograph No. 1: View of indoor air sample (IAS-07).

Photographer: Susan Kelly (Amec)

Location: (b)(6)
Date: 10/28/14



Photograph No. 2: View of crawlspace air sample (CAS-07).

Photographer: Susan Kelly (Amec)

Location: (b)(6)
Date: 10/28/14



Photograph No. 3: View of ambient air sample (AAS-07).	Location: (b)(6)
Photographer: Susan Kelly(Amec)	Date: 10/28/14



Photograph No. 4: View of ambient air sample (AAS-14) with duplicate (FD-09).	Location: (b)(6)
Photographer: Susan Kelly (Amec)	Date: 10/28/14



Photograph No. 5: View of ambient air sample (AAS-10).	Location: (b)(6)
Photographer: Susan Kelly (Amec)	Date: 10/28/14



Photograph No. 6: View of indoor air sample (IAS-10).	Location: (b)(6)
Photographer: Susan Kelly (Amec)	Date: 10/28/14



(b)(6)

Photograph No. 7: View of ambient air sample (AAS-09).	Location:
Photographer: Susan Kelly (Amec)	Date: 10/28/14



(b)(6)

Photograph No. 8: View of ambient air sample (AAS-08).	Location:
Photographer: Susan Kelly (Amec)	Date: 10/28/14



Photograph No. 9: View of indoor air sample (IAS-08) with duplicate (FD-10).

Location:

(b)(6)

Photographer: Susan Kelly (Amec)

Date: 10/28/14



Photograph No. 10: View of ambient air sample (AAS-13).

Location:

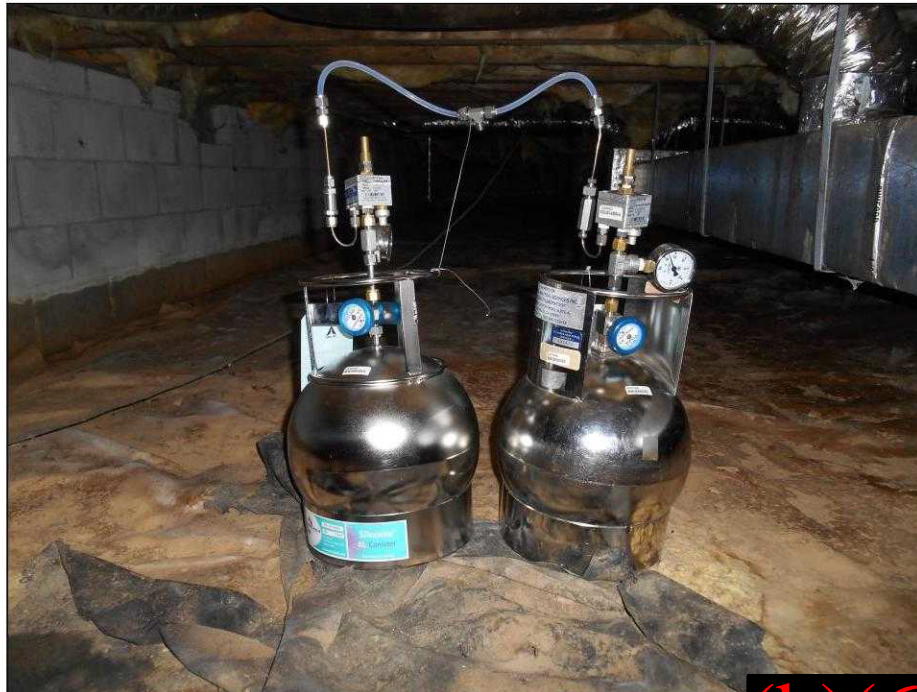
(b)(6)

Photographer: Susan Kelly (Amec)

Date: 10/28/14



Photograph No. 11: View of crawlspace air sample (CAS-13).	Location: (b)(6)
Photographer: Susan Kelly (Amec)	Date: 10/28/14



Photograph No. 12: View of crawlspace air sample (CAS-11) with duplicate (FD-11).	Location: (b)(6)
Photographer: Kirk Weir (Amec)	Date: 10/28/14



Photograph No. 13: View of indoor air sample (IAS-11).	Location: (b)(6)
Photographer: Susan Kelly (Amec)	Date: 10/28/14



Photograph No. 14: View of ambient air sample (AAS-12).	Location: (b)(6)
Photographer: Susan Kelly (Amec)	Date: 10/28/14



Photograph No. 15: View of crawlspace air sample (CAS-12).

Location:

(b)(6)

Photographer: Susan Kelly (Amec)

Date: 10/28/14

APPENDIX B

LOGBOOK AND FIELD DATA RECORDS

Location Asheville, NC

Date 10/28/14 27

Project / Client C/S of Asheville

6252120006 S. Kelly AMEC

P. 1/3

(b)(6)

8:30 Mobs is at residence
8:10 - M. Wallace (AMEC arrives at residence)

- deploy ambient air sample canister AAS-07 (8:58)
- deploy indoor air sample canister IAS-07 (9:25)
- deploy crawlspace air sample canister CAS-07 (8:40)

9:00 - travel to IS Busbee knoll

- deploy ambient air sample canisters AAS-14 and duplicate sample FD-09 (9:33)

9:55 - travel to (b)(6)

- deploy ambient air sample canister AAS-10 (10:17)
- deploy indoor air canister IAS-10 (10:25)
- deploy ambient air sample AAS-9 (10:39)

10:45 - travel to (b)(6)

- deploy ambient air sample

Location Ashville, NC Date 10/28/14Project / Client CTS of Asheville, Inc.6252120006 S. Kelly / AMEC P. 2/3

canister AAS-08 (10:56)

- deploy indoor air sample canisters IAS-08 and duplicate FD-10 (11:17)

1125 - travel to (b)(6)

- tenant is not home

1135 - all personnel leave residence

1620 - S. Kelly and M. Wallace arrive at (b)(6)

not home

1635 - travel to (b)(6)

homeowner is home but is leaving in a few minutes; she would prefer we just sample her crawlspace (not indoor)

- deploy ambient air sample canister AAS-13 (16:53)
- deploy crawlspace air sample canister CAS-13 (17:08)

1715 - travel to (b)(6)

- deploy crawlspace air canisters CAS-11 and duplicate FD-11 (1737)

- deploy indoor air sample canister IAS-11 (1747)

1750 - travel to (b)(6)

Location Ashville, NC Date 10/28/14Project / Client CTS of Asheville, Inc.6252120006 S. Kelly / AMEC P. 3/3

- tenant is not home
homeowner at (b)(6)
cannot find the key to the residence; therefore an indoor air sample is not possible

- USEPA project manager indicates that we should collect a crawlspace sample here, as collection of an indoor sample is not currently possible

- deploy ambient air canister AAS-12 (18:00)

- deploy crawlspace air canister CAS-12 (18:11)

1820 - all personnel leave

(b)(6), done for the day

M. Wallace 10/28/14

30

Location Asheville, NC Date 10/29/14Project / Client LTS of Asheville, Inc.6252120006 S. Kelly / AMEC P.1/2

805-S. Kelly / AMEC arrives at (b)(6)

(b)(6)

K. Stubbs / OTIE is at residence

1810-M. Wallace / AMEC arrives

- retrieve samples IAS-07, CAS-07,
and AAS-07

910-travel to 15 Busbee Knoll

- retrieve ambient air samples
AAS-14 and FD-09

(b)(6)

- retrieve ambient air samples
AAS-09 and AAS-10 and
indoor air sample IAS-10

1045-travel to (b)(6)

- retrieve samples AAS-08 and
indoor air samples IAS-08 and
FD-101130-AMEC and OTIE personnel
leave residence1150-S. Kelly / AMEC arrives at
(b)(6), P. Stubbs /
OTIE is at residence

(b)(6)

1155-M. Wallace / AMEC arrives

- retrieve air sample canisters

31

Location Asheville, NC Date 10/29/14Project / Client LTS of Asheville6252120006 S. Kelly / AMEC P.2/2

AAS-13 and CAS-13

1715-travel to (b)(6)

- retrieve samples CAS-11, FD-11,
and IAS-11

1750-travel to (b)(6)

retrieve samples AAS-12 and
CAS-12- pack sample canisters for
shipment to lab (ALS Env.)1815-AMEC and OTIE leave
residence- M. Wallace travels to FedEx
to drop off samples for
shipment~~Done
10/29/14~~

FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 10/29/14

Project Number: 6252-12-0006.03 (Vapor Intrusion Assessment)

Name: S. Kelly

Water Quality Meter Calibration

	<u>Standard Value</u>	<u>Meter Value</u>	<u>Acceptance Criteria</u>
Manufacturer: _____	pH: _____ SU	pH: _____ SU	+/- 10% of standard
Model No.: _____	Conductivity: _____ mS/cm	Conductivity: _____ mS/cm	+/- 10% of standard
Unit ID: _____	Redox: _____ +/- mV	Redox: _____ +/- mV	see note 1
	DO: _____ mg/L *	DO: _____ mg/L	+/- 10% of standard
Thermometer Temperature: _____ C°		Temperature: _____ C°	+/- 2.0 C°

Turbidity Meter Calibration

	<u>Standard Value</u>	<u>Meter Value</u>	<u>Acceptance Criteria</u>
Manufacturer: _____	_____ NTU (low)	_____ NTU	+/- 10% of standard
Model No.: _____	_____ NTU (med)	_____ NTU	+/- 10% of standard
Unit ID: _____	_____ NTU (high)	_____ NTU	+/- 10% of standard

Photoionization Detector

			<u>Acceptance Criteria</u>
Manufacturer: <u>RAE</u>	Background: <u>0.0</u> ppmv	Meter: <u>0.0</u> ppmv	within 5 ppmv of Zero
Model No.: <u>Mini RAE 2000</u>	Span Gas: <u>100</u> ppmv	Meter: <u>100</u> ppmv	+/- 10% of standard
Unit ID: <u>ASHB-01</u>			

Calibration Sources

	<u>Source</u>	<u>Value</u>	<u>Lot Number</u>	<u>Expiration Date</u>
pH	_____	_____ SU	_____	_____
Conductivity	_____	_____ mS/cm	_____	_____
Redox:	_____	_____ mV	_____	_____
Turbidity (low)	_____	_____ NTU	_____	_____
Turbidity (med):	_____	_____ NTU	_____	_____
Turbidity (high):	_____	_____ NTU	_____	_____
PID gas:	<u>isobutylene</u>	<u>100</u> ppmv	<u>012FF14</u>	<u>4/27/18</u>
Other:	_____	_____	_____	_____

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv).

FIELD INSTRUMENT CALIBRATION RECORD

Project Name: CTS of Asheville, Inc. Superfund Site

Date: 1/28/14

Project Number: 6252-12-0006.03 (Vapor Intrusion Assessment)

Name: S Kelly

Water Quality Meter Calibration

Standard Value

Meter Value

Acceptance Criteria

Manufacturer: _____	pH: _____ SU	pH: _____ SU	+/- 10% of standard
Model No.: _____	Conductivity: _____ mS/cm	Conductivity: _____ mS/cm	+/- 10% of standard
Unit ID: _____	Redox: _____ +/- mV	Redox: _____ +/- mV	see note 1
	DO: _____ mg/L *	DO: _____ mg/L	+/- 10% of standard
Thermometer Temperature: _____ C°		Temperature: _____ C°	+/- 2.0 C°

Turbidity Meter Calibration

Standard Value

Meter Value

Acceptance Criteria

Manufacturer: _____	_____ NTU (low)	_____ NTU	+/- 10% of standard
Model No.: _____	_____ NTU (med)	_____ NTU	+/- 10% of standard
Unit ID: _____	_____ NTU (high)	_____ NTU	+/- 10% of standard

Photoionization Detector

Acceptance Criteria

Manufacturer: <u>RAE</u>	Background: <u>0.0</u> ppmv	Meter: <u>0.0</u> ppmv	within 5 ppmv of Zero
Model No.: <u>mini RAE 2000</u>	Span Gas: <u>100</u> ppmv	Meter: <u>100</u> ppmv	+/- 10% of standard
Unit ID: <u>ASHE-01</u>			

Calibration Sources

	Source	Value	Lot Number	Expiration Date
pH	_____	_____ SU	_____	_____
Conductivity	_____	_____ mS/cm	_____	_____
Redox:	_____	_____ mV	_____	_____
Turbidity (low)	_____	_____ NTU	_____	_____
Turbidity (med):	_____	_____ NTU	_____	_____
Turbidity (high):	_____	_____ NTU	_____	_____
PID gas:	<u>isobutylene</u>	<u>100</u> ppmv	<u>012FF14</u>	<u>1/27/18</u>
Other:	_____	_____	_____	_____

NOTES:

* = Indicate in notes section what was used as the DO standard (i.e., based on saturation at room temperature)

** = If the meter reading is not within acceptance criteria, clean or replace probe and re-calibrate, or use a different meter if available. If project requirements necessitate use of the instrument, clearly document on all data sheets and log book entries that the parameter was not calibrated to the acceptance criteria.

1 = meter must read within specified range of the Zobell solution (usually 231 +/- 10 mv).

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: Skelly Im Wallace

Sample ID: IAS-07

(b)(6)

Sample Location: indoor / den

Canister ID: AC01048

Flow Controller ID: FCA00783

Gauge ID: AVG04176

Intake Height (ft): 2.8

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>8:25</u>	<u>8:25</u>
Canister Pressure*:	<u>27.2" Hg</u>	<u>6.5" Hg</u> <u>6.5" Hg 10/29/14</u>
Outdoor Temperature*:	<u>56°F</u>	<u>62°F</u>
Interior Temperature*:	<u>65°F</u>	<u>69°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>calm</u>

canister pressure with analog gauge: 26.5/6" Hg

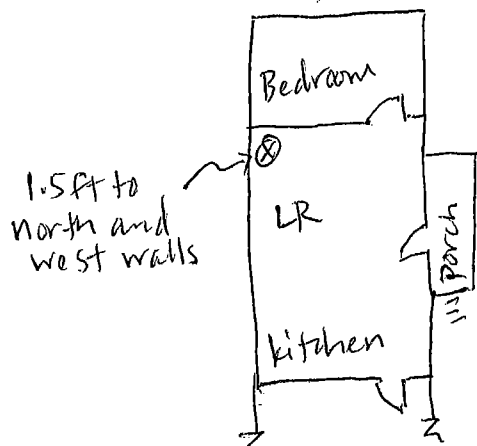
Antecedent weather conditions:

clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast, mid-40s to mid-70s (°F) no precipitation

Sketch of sampling area:



Not to scale
space heater on in living room

* Indicate unit of measurement.

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: Steddy / M. Wallace

Sample ID: CAS-07

Sample Location: crawlspace

Canister ID: AG01940

Flow Controller ID: FCA00869

Gauge ID: AVG03873

Intake Height (ft): 1.8

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>8:40</u>	<u>8:40</u>
Canister Pressure*:	<u>26.5" Hg</u>	<u>0.0" Hg</u>
Outdoor Temperature*:	<u>57°F</u>	<u>58°F</u>
↪ <u>crawlspace</u> Interior Temperature*:	<u>52°F</u>	<u>57°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>slight from the west</u>

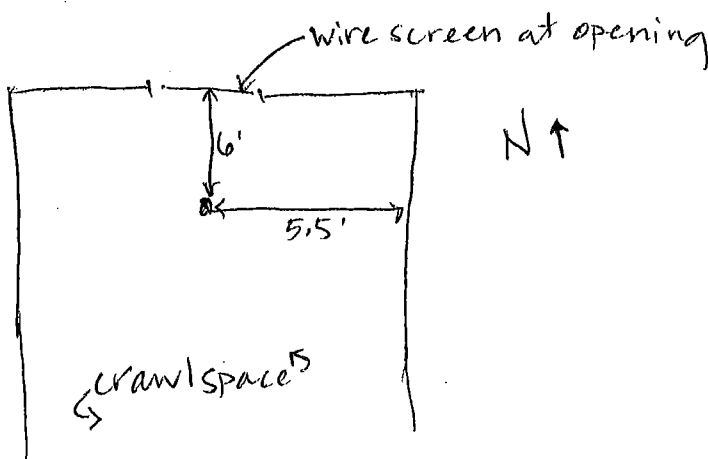
canister pressure with analog gauge: 30+"/2.5" Hg

Antecedent weather conditions: clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast, mid-40s to mid-70s (°F), no precipitation

Sketch of sampling area:



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: AAS-07

(b)(6)

Canister ID: AS00791

Sample Location: ambient

Flow Controller ID: FCA 00378

Gauge ID: AVG 03982

Intake Height (ft): 4.6

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>8:58</u>	<u>8:58</u>
Canister Pressure*:	<u>26.3" Hg</u>	<u>0.2" Hg</u>
Outdoor Temperature*:	<u>52°F</u>	<u>58°F</u>
Interior Temperature*:	<u>N/A</u>	<u>N/A</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>slight from the west</u>

analog pressure gauge: 28.0 / 0.0" Hg

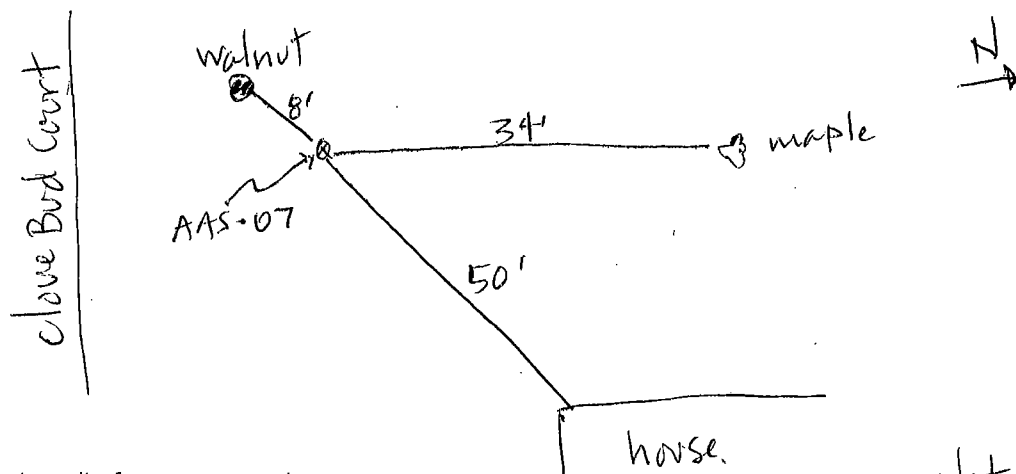
Antecedent weather conditions:

clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast, mid-40s to mid-70s (°F), no precipitation

Sketch of sampling area:



* Indicate unit of measurement.

Not to Scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: AAS-14

(b)(6)

Sample Location: ambient

Canister ID: AS00798

Flow Controller ID: FCA00735

Gauge ID: AVG103678

Intake Height (ft): 3.8

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>9:33</u>	<u>9:33</u>
Canister Pressure*:	<u>25.8" Hg</u>	<u>0.4" Hg</u>
Outdoor Temperature*:	<u>60°F</u>	<u>58°F</u>
Interior Temperature*:	<u>N/A</u>	<u>N/A</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>slight from the south</u>

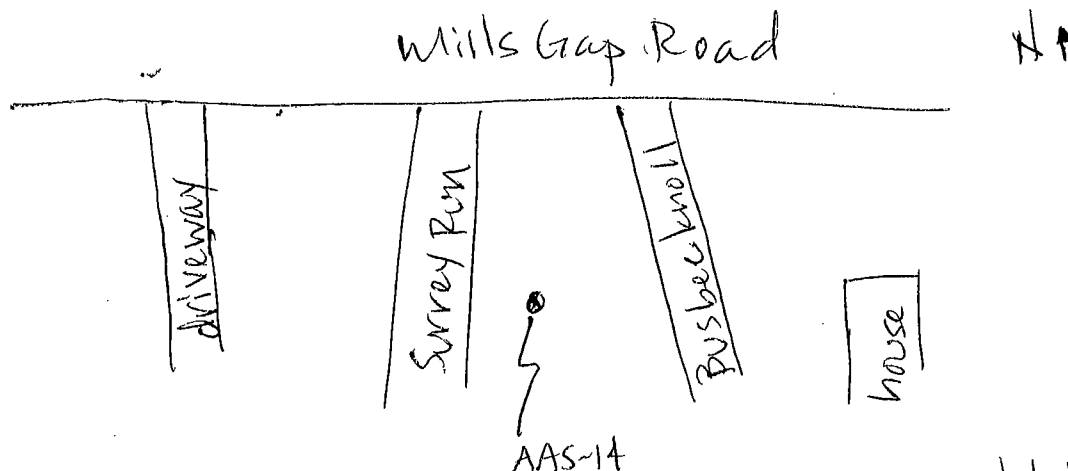
Canister pressure with analog gauge: 29.0 / 1.5" Hg
Antecedent weather conditions:

clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast, mid-40s to mid-70's (°F), no precip.

Sketch of sampling area:



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: FD-09

(b)(6)

Sample Location: ambient (AAS-14)

Canister ID: AS00744

Flow Controller ID: FCA00536

Gauge ID: AVG03391

Intake Height (ft): 3.8

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>9:33</u>	<u>9:33</u>
Canister Pressure*:	<u>26.2" Hg</u>	<u>5.6" Hg</u>
Outdoor Temperature*:	<u>60°F</u>	<u>58°F</u>
Interior Temperature*:	<u>N/A</u>	<u>N/A</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>slight from the south</u>

Antecedent weather conditions:

See AAS-14

Weather conditions during sample period:

See AAS-14

Sketch of sampling area:

See AAS-14

* Indicate unit of measurement.

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: AAS-10

(b)(6)

Sample Location: ambient

Canister ID: AC01854

Flow Controller ID: FCA00843

Gauge ID: AVG03224

Intake Height (ft): 4.3

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>10:17</u>	<u>10:17</u>
Canister Pressure*:	<u>26.6" Hg</u> <small>sp/10/28/14</small>	<u>3.9" Hg</u>
Outdoor Temperature*:	<u>60 63°F</u>	<u>57°F</u>
Interior Temperature*:	<u>N/A</u>	<u>N/A</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>slight</u> <u>from W/NW</u>

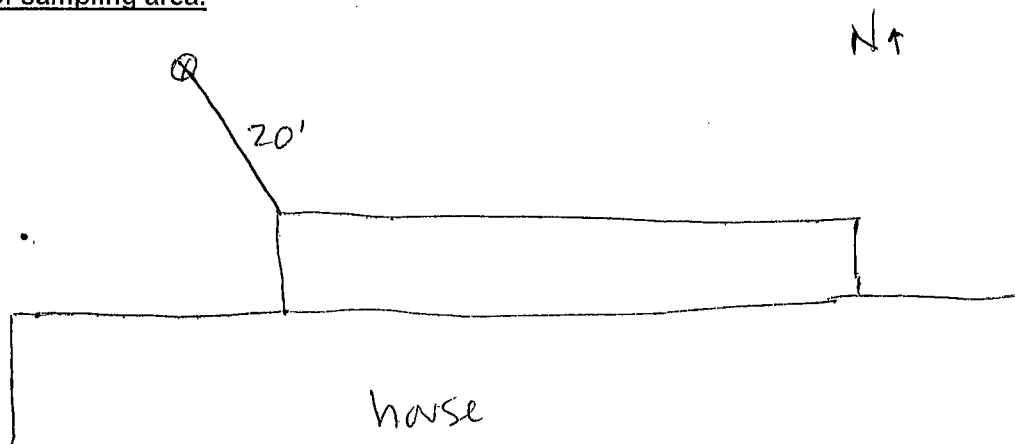
analog gauge: 28.5 / 6" Hg
Antecedent weather conditions:

clear, mid-40s to mid-70s (°F) no precipitation

Weather conditions during sample period:

clear to overcast, mid-40s to mid-70s (°F), no precip.

Sketch of sampling area:



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: IAS-10

Sample Location: indoor / den

Canister ID: AC01157

Flow Controller ID: FCA00623

Gauge ID: AVG03952

Intake Height (ft): 3.0

Start

Stop

Sample Date: 10/28/14

10/29/14

Sample Time: 10:25

10:25

Canister Pressure*: 26.8" Hg

6.9" Hg

Outdoor Temperature*: 63°F

57°F

Interior Temperature*: 70°F

68°F

PID Reading (ppm): 0.1

0.1 - 0.2

Wind Direction: calm

Slight
from W/NW

analog gauge: 27.5 / 6" Hg

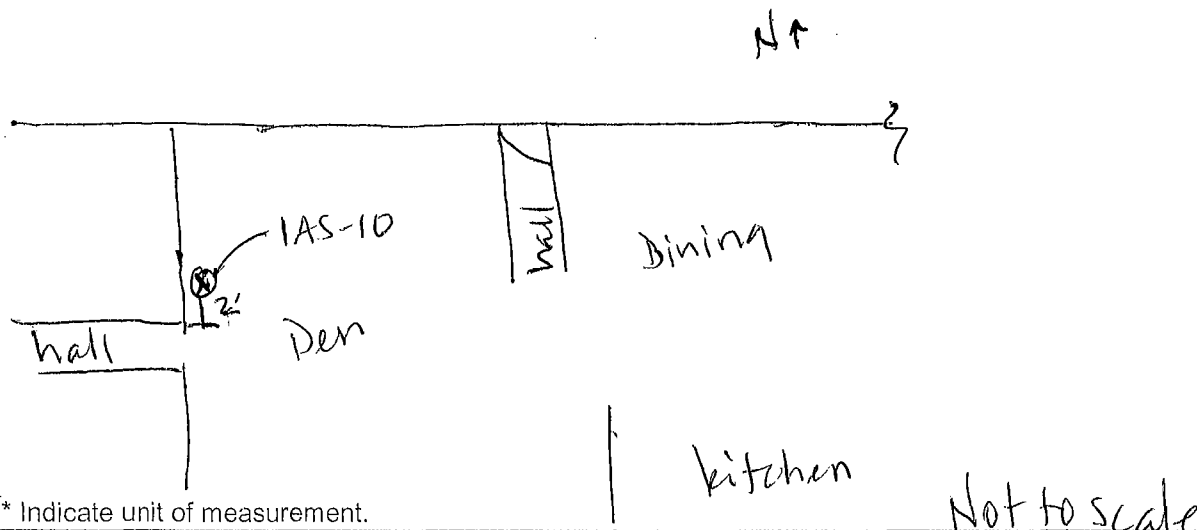
Antecedent weather conditions:

clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast / cloudy, mid-40s to mid-70s, no precip

Sketch of sampling area:



* Indicate unit of measurement.

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc. Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly (m. Wallace) Sample ID: AAS-09

Sample Location: ambient

Canister ID: AC.02022 Flow Controller ID: FCA 00247

Gauge ID: AVG04177 Intake Height (ft): 4.5

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>10:39</u>	<u>10:39</u>
Canister Pressure*:	<u>27.2" Hg</u>	<u>0.8" Hg</u>
Outdoor Temperature*:	<u>66°F</u>	<u>60°F</u>
Interior Temperature*:	<u>N/A</u>	<u>N/A</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>calm</u>

analog gauge: 27.5" Hg / 0.5" Hg

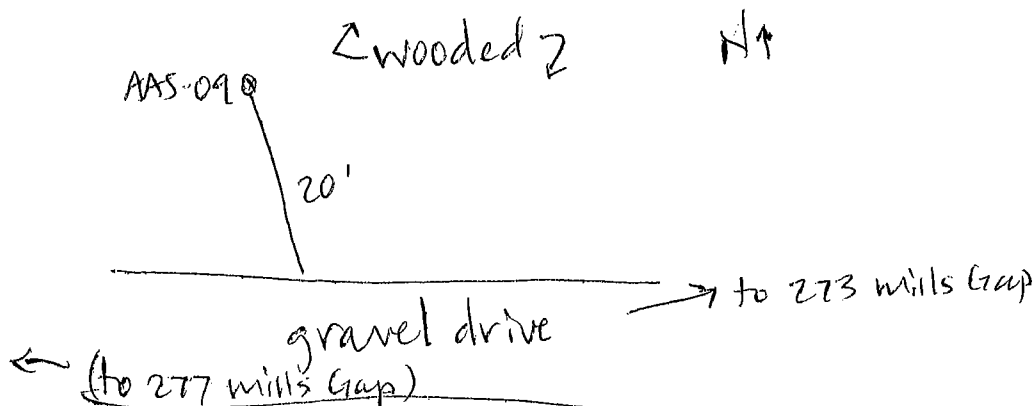
Antecedent weather conditions:

clear, mid-40s to mid-70s(°F), no precipitation

Weather conditions during sample period:

clear to overcast/cloudy, mid-40s to mid-70s, no precip

Sketch of sampling area:



* Indicate unit of measurement.

house

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: AAS-08

(b)(6)

Sample Location: ambient

Canister ID: AS00795

Flow Controller ID: FCA007164

Gauge ID: AVG103402

Intake Height (ft): 4.4

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>1056</u>	<u>1056</u>
Canister Pressure*:	<u>26.3" Hg</u>	<u>5.8" Hg</u>
Outdoor Temperature*:	<u>68 °F</u>	<u>59 °F</u>
Interior Temperature*:	<u>N/A</u>	<u>N/A</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>calm</u>	<u>calm</u>

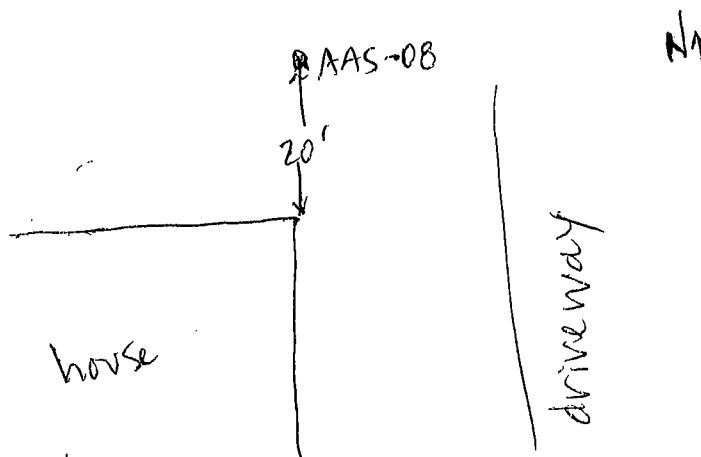
Antecedent weather conditions:

clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast/cloudy, mid-40s to mid-70s, slight

Sketch of sampling area: drizzle at time of retrieval



* Indicate unit of measurement.

Not to Scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: Sikelty/m.wallace

Sample ID: 1AS-08

(b)(6)

Sample Location: indoor

Canister ID: AS 00796

Flow Controller ID: FCA 00364

Gauge ID: AVG103252

Intake Height (ft): 3.2

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>11:17</u>	<u>11:17</u>
Canister Pressure*:	<u>26.4" Hg</u>	<u>2.5" Hg</u>
Outdoor Temperature*:	<u>70°F</u>	<u>62°F</u>
Interior Temperature*:	<u>78°F</u>	<u>70°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0 - 0.1</u>
Wind Direction:	<u>calm</u>	<u>calm</u>

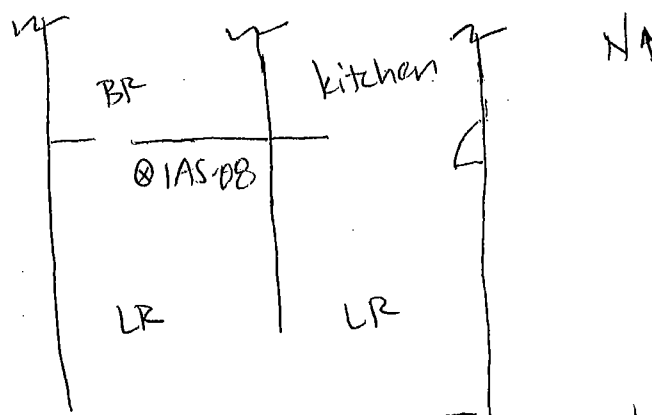
Antecedent weather conditions:

Clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

Clear to overcast / cloudy, mid-40s to mid-70s, slight
drizzle at time of retrieval

Sketch of sampling area:



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: FD-10

(b)(6)

Sample Location: indoor (IAS-08)

Canister ID: AS00789

Flow Controller ID: FCA00018

Gauge ID: AVG 03994

Intake Height (ft): 3.2

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>1117</u>	<u>1117</u>
Canister Pressure*:	<u>26.2" Hg</u>	<u>7.0" Hg</u>
Outdoor Temperature*:	<u>70°F</u>	<u>62°F</u>
Interior Temperature*:	<u>78°F</u>	<u>70°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0 - 0.1</u>
Wind Direction:	<u>calm</u>	<u>calm</u>

Antecedent weather conditions:

see IAS-08

Weather conditions during sample period:

see IAS-08

Sketch of sampling area:

see IAS-08

* Indicate unit of measurement.

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: AAS-13

(b)(6)

Sample Location: ambient

Canister ID: AS00763

Flow Controller ID: FCA00178

Gauge ID: AVG103722

Intake Height (ft): 4.7

Start

Stop

Sample Date: 10/28/14

10/29/13

Sample Time: 16:58

16:58

Canister Pressure*: 26.6" Hg

7.1" Hg

Outdoor Temperature*: 76°F

56°F

Interior Temperature*: N/A

N/A

PID Reading (ppm): 0.0

0.0

Wind Direction: slight from the east

from the east

analog gauge*: 27" Hg / 7.5" Hg

Antecedent weather conditions:

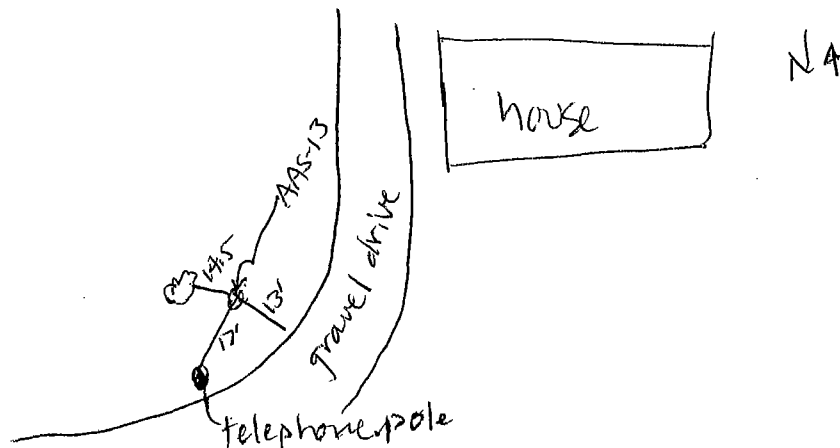
clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast / cloudy, mid-40s to mid-70s, slight

precipitation on 10/29/14 afternoon

Sketch of sampling area:



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: CAS-13

(b)(6)

Sample Location: crawlspace

Canister ID: AS00804

Flow Controller ID: FCA00690

Gauge ID: AV603432

Intake Height (ft): 1.8

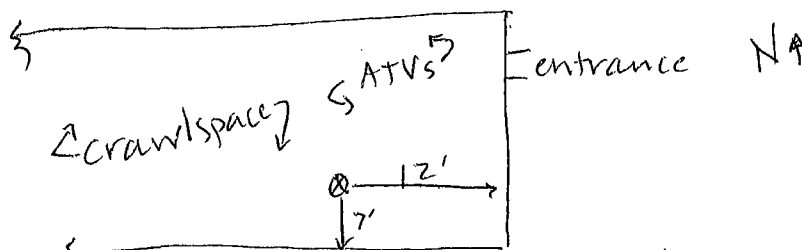
	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>17:08</u>	<u>17:08</u>
Canister Pressure*:	<u>26.5" Hg</u>	<u>0.1" Hg</u>
Outdoor Temperature*:	<u>76°F</u>	<u>56°F</u>
<u>crawlspace</u> Interior Temperature*:	<u>67°F</u>	<u>60°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>slight from the east</u>	<u>slight from the east</u>
Antecedent weather conditions:	<u>analog gauge: 29" Hg / 0.5" Hg</u> <u>clear, mid-40s to mid-70s (°F), no precipitation</u>	

Weather conditions during sample period:

clear to overcast / cloudy, mid-40s to mid-70s; slight precipitation on 10/29/14 afternoon

Sketch of sampling area:

- slight petroleum odor near entrance
- foundation vents are open
- sample located adjacent to sewer pipe



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: CAS-11

(b)(6)

Sample Location: crawlspace

Canister ID: AC01460

Flow Controller ID: FCA00427

Gauge ID: AVG03902

Intake Height (ft): 1.7

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>17:37</u>	<u>17:37</u>
Canister Pressure*:	<u>27.0" Hg</u>	<u>1.4" Hg</u>
Outdoor Temperature*:	<u>78°F</u>	<u>56°F</u>
Interior Temperature*:	<u>66°F</u>	<u>58°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>slight from the east</u>	<u>calm</u>

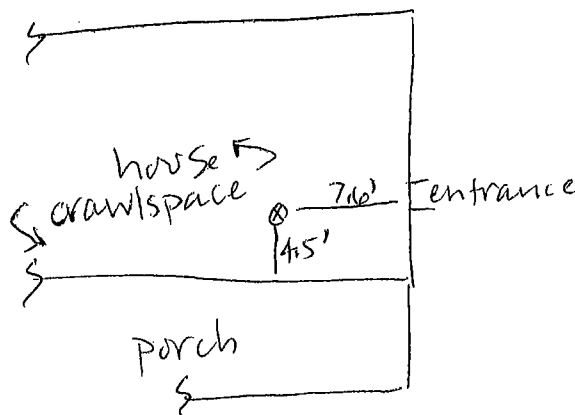
analog gauge: 28" Hg /
Antecedent weather conditions:

clear, mid-40s to mid-70s, no precipitation

Weather conditions during sample period:

clear to overcast / cloudy, mid-40s to mid-70s, slight

Sketch of sampling area: precipitation on 10/29/14 afternoon



* Indicate unit of measurement.

No to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: FD-11

Sample Location: crawl space (CAS-11)

Canister ID: AS00803

Flow Controller ID: FCA00478

Gauge ID: AVG03765

Intake Height (ft): 1.7

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>17:37</u>	<u>17:37</u>
Canister Pressure*:	<u>26.6" Hg</u>	<u>3.4" Hg</u>
Outdoor Temperature*:	<u>78°F</u>	<u>56°F</u>
Interior Temperature*:	<u>66°F</u>	<u>58°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>Slight from</u>	<u>calm</u>

analog gauge: 30" ^{east} Hg / 5.5" Hg
Antecedent weather conditions)

See CAS-11

Weather conditions during sample period:

See CAS-11

Sketch of sampling area:

See CAS-11

* Indicate unit of measurement.

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: Skelly/M. Wallace

Sample ID: IAS-11

(b)(6)

Sample Location: indoor/den

Canister ID: AS00658

Flow Controller ID: FCA00251

Gauge ID: AVG038416

Intake Height (ft): 2.8

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>1747</u>	<u>1747</u>
Canister Pressure*:	<u>26.8" Hg</u>	<u>0.1" Hg</u>
Outdoor Temperature*:	<u>77°F</u>	<u>56°F</u>
Interior Temperature*:	<u>75°F</u>	<u>65°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>Slight from the east</u>	<u>calm</u>

analog gauge: 27" Hg / 0.0" Hg

Antecedent weather conditions:

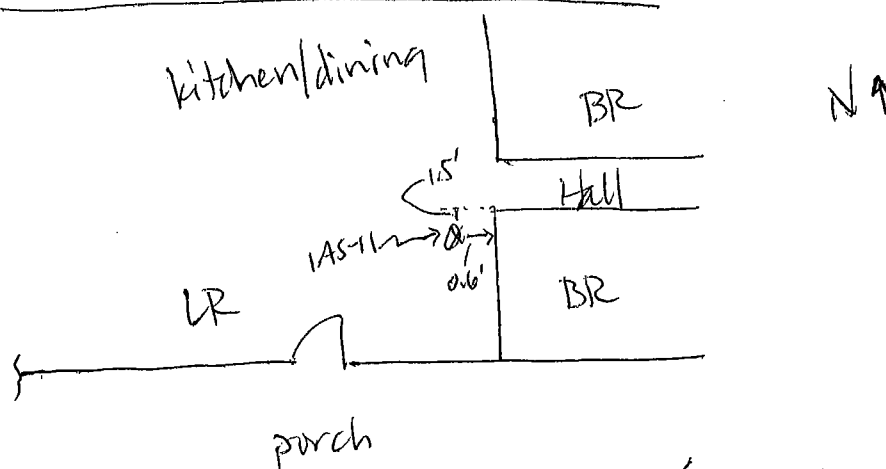
clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast / cloudy, mid-40s to mid-70s, slight

precipitation in afternoon of 10/29/14

Sketch of sampling area:



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: S. Kelly / M. Wallace

Sample ID: AAS-12

(b)(6)

Canister ID: AS00675

Sample Location: ambient

Flow Controller ID: FCA00409

Gauge ID: AVG03821

Intake Height (ft): 4.6

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>18:00</u>	<u>18:00</u>
Canister Pressure*:	<u>24.8" Hg</u>	<u>6.9" Hg</u>
Outdoor Temperature*:	<u>75°F</u>	<u>55°F</u>
Interior Temperature*:	<u>N/A</u>	<u>N/A</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>slight from the east</u>	<u>calm</u>

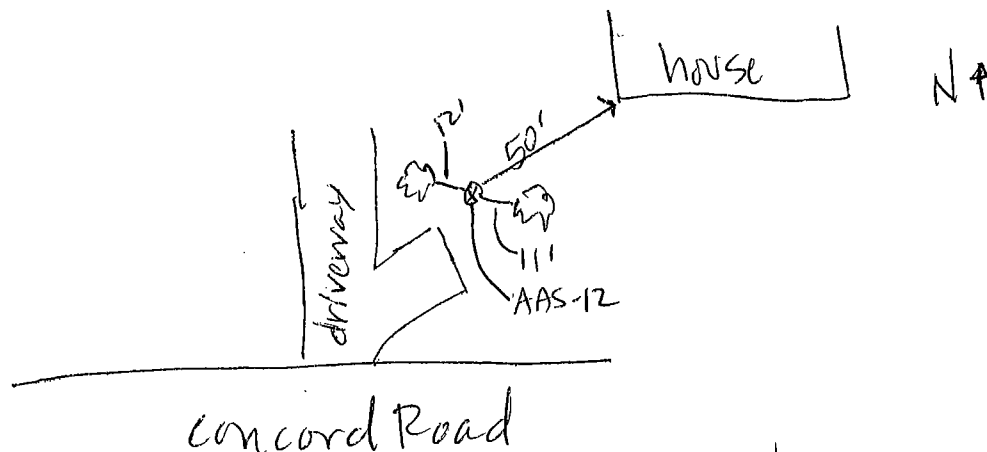
analog gauge: 29.5" Hg / 2" Hg

Antecedent weather conditions: clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast / cloudy, mid-40s to mid-70s, slight precipitation in afternoon of 10/29/14

Sketch of sampling area:



* Indicate unit of measurement.

Not to scale

AIR SAMPLING FIELD DATA RECORD

Project Name: CTS of Asheville, Inc.

Project Number: 6252-12-0006.03

Sampling Personnel: Skelly/Mar Wallace

Sample ID: CAS-12

(b)(6)

Sample Location: crawlspace

Canister ID: AS00172

Flow Controller ID: FCA 00311

Gauge ID: AVG 03499

Intake Height (ft): 1.9

	<u>Start</u>	<u>Stop</u>
Sample Date:	<u>10/28/14</u>	<u>10/29/14</u>
Sample Time:	<u>18:11</u>	<u>18:11</u>
Canister Pressure*:	<u>26.9" Hg</u>	<u>7.8" Hg</u>
Outdoor Temperature*:	<u>75°F</u>	<u>55°F</u>
↪crawlspace Interior Temperature*:	<u>65°F</u>	<u>55°F</u>
PID Reading (ppm):	<u>0.0</u>	<u>0.0</u>
Wind Direction:	<u>slight from the east</u>	<u>calm</u>

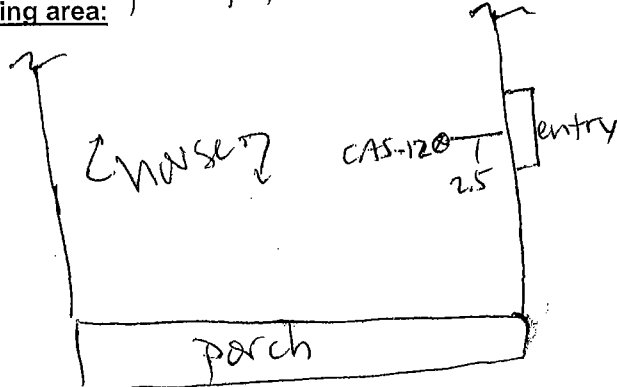
analog gauge: 27.5" Hg / 7" Hg

Antecedent weather conditions: clear, mid-40s to mid-70s (°F), no precipitation

Weather conditions during sample period:

clear to overcast / cloudy, mid 40s to mid-70s, slight precipitation afternoon of 10/29/14

Sketch of sampling area:



* Indicate unit of measurement.

foundation vent open

Not to Scale

PHOTOGRAPH RECORD

Page 1 of 2

Project Name: CTS of Asheville, Inc. Superfund Site

Project Number: 6252-12-0006.03

Task/Activity: Vapor Intrusion Assessment

Personnel: S. Kelly Im. Wallace

File Name	Date	Time	Description
DSCN 3554	10/28/14	830	view of IAS-07
3555	10/28/14	847	view of crawlspace at (b)(6)
3556	10/28/14	851	view of CAS-07
3557	10/28/14	900	view of AAS-07
3558	10/28/14	900	view of AAS-07
3559	10/28/14	944	view of AAS-14 / FD-09
3560	10/28/14	944	view of AAS-14 / FD-09
3561	10/28/14	944	view of AAS-14 / FD-09
3562	10/28/14	1030	view of AAS-10
3563	10/28/14	1031	view of AAS-10
3564	10/28/14	1034	view of IAS-10
3565	10/28/14	1034	view of IAS-10
3566	10/28/14	1049	view of AAS-09
3567	10/28/14	1049	view of AAS-09
3568	10/28/14	1105	view of AAS-08
3569	10/28/14	1105	view of AAS-08
3570	10/28/14	1127	view of IAS-08 / FD-10
3571	10/28/14	1127	view of IAS-08 / FD-10
3572	10/28/14	1712	view of AAS-13
3573	10/28/14	1713	view of AAS-13
3574	10/28/14	1720	view of CAS-13
3575	10/28/14	1720	view of crawlspace at 28 Clare Blvd
3576	10/28/14	1746	view of CAS-11 / FD-11
3577	10/28/14	1750	view of IAS-11
3578	10/28/14	1810	view of AAS-12
3579	10/28/14	1810	view of AAS-12

PHOTOGRAPH RECORD

Page ____ of ____

Project Name: CTS of Asheville, Inc. Superfund Site

Project Number: 6252-12-0006.03

Task/Activity: Vapor Intrusion Assessment

Personnel: S. Kelly / Mr. Wallace

[illegible]

APPENDIX C

LABORATORY INDIVIDUAL CERTIFICATION DOCUMENTS



QC Certification

ALS Environmental
2655 Park Center Drive, Suite A
Simi Valley, CA 93065
Ph. 805-526-7161
Fax 805-526-7270

<u>Container IDs</u>	<u>Cleaned Date</u>	<u>Date Analyzed</u>	<u>QC Results</u>	<u>Comments</u>
AC01048*	10/16/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AC01157*	10/14/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AC01460*	10/14/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AC01854*	10/10/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AC01940*	10/10/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AC02022*	10/16/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00172*	10/16/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00658*	10/14/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00675*	10/10/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00744*	10/11/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00760*	10/11/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00763*	10/20/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00789*	10/10/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00791*	10/10/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00795*	10/10/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00796*	10/20/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00798*	10/10/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00800*	10/8/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00803*	10/20/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
AS00804*	10/8/14	10/20/14	Pass w/ Conditions	EPA TO-15 (Client Specified)
FCA00018	10/1/14	10/2/14		
FCA00178	9/29/14	9/30/14		
FCA00247	10/8/14	10/8/14		
FCA00254	10/7/14	10/7/14		
FCA00311	10/15/14	10/16/14		
FCA00364	10/15/14	10/16/14		
FCA00378	10/7/14	10/7/14		
FCA00409	10/1/14	10/2/14		

* QC Canister

<u>Container IDs</u>	<u>Cleaned Date</u>	<u>Date Analyzed</u>	<u>QC Results</u>	<u>Comments</u>
FCA00427	10 ~ 14	10 ~ 14		
FCA00478	9 29 14	9 30 14		
FCA00538	10 1 14	10 2 14		
FCA00569	10 9 14	10 13 14		
FCA00623	9 1 ~ 14	9 1 ~ 14		
FCA00689	9 18 14	9 22 14		
FCA00690	10 10 14	10 13 14		
FCA00735	10 10 14	10 13 14		
FCA00764	10 8 14	10 8 14		
FCA00783	10 9 14	10 13 14		
FCA00843	9 29 14	9 30 14		

* QC Canister

APPENDIX D

LABORATORY ANALYTICAL REPORT



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
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www.alsglobal.com

LABORATORY REPORT

December 17, 2014

Susan Kelly
AMEC Environment & Infrastructure, Inc.
1308 Patton Ave
Asheville, NC 28806-2604

RE: CTS of Asheville / 6252-12-0006

Dear Susan:

A Tier III has been generated for report number P1404544 for the samples submitted to our laboratory on November 6, 2014.

Your report number P1404452 has been amended for the samples submitted to our laboratory on October 30, 2014. The case narrative did not include a note discussing a QC exceedance for one of the internal standards. The IS/RT Summary and MB Summary forms have been revised for corrected for errors. The pages have been revised and indicated by the "Revised Page" footer located at the bottom right of the page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Kate Aguilera at 2:41 pm, Dec 17, 2014

Kate Aguilera
Project Manager



2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: AMEC Environment & Infrastructure, Inc.
Project: CTS of Asheville / 6252-12-0006

Service Request No: P1404452

CASE NARRATIVE

The sample were received intact under chain of custody on October 30, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed in SIM mode for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is not included on the laboratory's AIHA-LAP scope of accreditation.

The response for the Chlorobenzene-d5 internal standard in samples AAS-07 and AAS-10 were outside control criteria; however, this compound is not associated with the target analytes included in this report. The results were not affected. No corrective action was appropriate.

The Summa canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.



2655 Park Center Dr., Suite A
 Simi Valley, CA 93065
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www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	643428
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA01627201 4-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AMEC Environment & Infrastructure, Inc.
Project ID: CTS of Asheville / 6252-12-0006

Service Request: P1404452

Date Received: 10/30/2014
Time Received: 09:32

TO-15 - VOC SIM

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfi1 (psig)	
TB-04	P1404452-001	Air	10/29/2014	00:00	AS00760	-14.18	3.70	X
FD-09	P1404452-002	Air	10/29/2014	00:00	AS00744	-3.07	3.58	X
FD-10	P1404452-003	Air	10/29/2014	00:00	AS00789	-4.04	3.62	X
FD-11	P1404452-004	Air	10/29/2014	00:00	AS00803	-2.05	3.52	X
CAS-07	P1404452-006	Air	10/29/2014	08:40	AC01940	-0.28	4.03	X
AAS-07	P1404452-007	Air	10/29/2014	08:58	AS00791	-0.18	3.77	X
AAS-14	P1404452-008	Air	10/29/2014	09:33	AS00798	-0.50	3.93	X
AAS-10	P1404452-009	Air	10/29/2014	10:17	AC01854	-2.28	3.58	X
IAS-10	P1404452-010	Air	10/29/2014	10:25	AC01157	-3.99	3.66	X
AAS-09	P1404452-011	Air	10/29/2014	10:39	AC02022	-0.76	3.56	X
AAS-08	P1404452-012	Air	10/29/2014	10:56	AS00795	-3.25	3.67	X
IAS-08	P1404452-013	Air	10/29/2014	11:17	AS00796	-1.87	3.58	X
AAS-13	P1404452-014	Air	10/29/2014	16:58	AS00763	-3.83	3.76	X
CAS-13	P1404452-015	Air	10/29/2014	17:08	AS00804	-0.43	3.56	X
CAS-11	P1404452-016	Air	10/29/2014	17:37	AC01460	-1.04	3.75	X
AAS-12	P1404452-018	Air	10/29/2014	18:00	AS00675	-0.66	3.82	X
CAS-12	P1404452-019	Air	10/29/2014	18:11	AS00172	-4.22	3.86	X



Air - Chain of Custody Record & Analytical Service Request

Page 1 of 2

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. PA404452

Company Name & Address (Reporting Information)

AMEC
1308 Patton Avenue
Asheville NC 28806

Project Name

CTS of Asheville

ALS Contact:

E. Aguilera
Analysis Method

Project Number

6252-12-0006

P.O. # / Billing Information

PO: C012504000

invoice to: kris.salvatore@amec.com

Sampler (Print & Sign)

Susan Kelly [Signature]

TD-15 SIM
(site-specific list)

Comments
e.g. Actual
Preservative
or
specific
instructions

Client Sample ID

Laboratory
ID NumberDate
CollectedTime
CollectedCanister ID
(Bar code # -
AC, SC, etc.)Flow Controller ID
(Bar code # - FC #)Canister
Start Pressure
"HgCanister
End Pressure
"Hg sigSample
Volume

TB-04

①-14-22

lab prep

AS00760

N/A

N/A

N/A

N/A

x

FD-09

②-3-13

10/29/14 00:00

AS00744

FLA00536

26.2

5.6

x

FD-10

③-4-13

10/29/14 00:00

AS00789

FLA00018

26.2

3.2

x

FD-11

④-2-15

10/29/14 00:00

AS00803

FLA00478

26.6

3.4

x

IAS-07

⑤-3-68

10/29/14 08:25

AC01048

FLA00783

27.2

6.5

x

CAS-07

⑥-0-34

10/29/14 08:40

AC01940

FLA00869

26.5

0.0

x

AAS-07

⑦-0-26

10/29/14 08:58

AS00791

FLA00378

26.3

0.2

x

AAS-14

⑧-0-60

10/29/14 09:33

AS00798

FLA00735

25.8

0.4

x

AAS-10

⑨-2-29

10/29/14 10:17

AC01854

FLA00893

26.6

3.9

x

IAS-10

⑩-4-63

10/29/14 10:25

AC01157

FLA00623

26.8

6.9

x

AAS-09

⑪-0-82

10/29/14 10:39

AC02022

FLA00247

27.2

0.8

x

AAS-08

⑫-3-35

10/29/14 10:56

AS00795

FLA00764

26.3

5.9

x

IAS-08

⑬-1-93

10/29/14 11:17

AS00796

FLA00369

26.4

2.5

x

AAS-13

⑭-3-86

10/29/14 16:58

AS00763

FLA00178

26.6

7.1

N/A

Report Tier Levels - please select

Tier I - Results (Default in not specified)

Tier III (Results + QC & Calibration Summaries)

Tier II (Results + QC Summaries)

Tier IV (Date Validation Package) 10% Surcharge

x

EDD required YES No

Type: excel

Units:

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements

(MRLs, QAPP)

Project

QAPP

Relinquished by: (Signature)

Matter & W... [Signature]

Date:

10/29/14

Time:

19:00

Received by: (Signature)

[Signature]

Date:

10/30/14

Time:

0732

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Date:

Time:

Cooler / Blank

Temperature °C

ALS Environmental
Sample Acceptance Check Form

Client: AMEC Environment & Infrastructure, Inc.

Work order: P1404452

Project: CTS of Asheville / 6252-12-0006

Sample(s) received on: 10/30/14

Date opened: 10/30/14

by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

	Yes	No	N/A
1 Were sample containers properly marked with client sample ID?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2 Container(s) supplied by ALS ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 Did sample containers arrive in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Were chain-of-custody papers used and filled out?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 Did sample container labels and/or tags agree with custody papers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6 Was sample volume received adequate for analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 Are samples within specified holding times?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 Was proper temperature (thermal preservation) of cooler at receipt adhered to?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9 Was a trip blank received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10 Were custody seals on outside of cooler/Box?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Location of seal(s)? _____ Sealing Lid?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were signature and date included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were seals intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Were custody seals on outside of sample container?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Location of seal(s)? _____ Sealing Lid?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were signature and date included?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were seals intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11 Do containers have appropriate preservation , according to method/SOP or Client specified information?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is there a client indication that the submitted samples are pH preserved?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Were VOA vials checked for presence/absence of air bubbles?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12 Tubes: Are the tubes capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Do they contain moisture?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13 Badges: Are the badges properly capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Are dual bed badges separated and individually capped and intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1404452-001.01	6.0 L Silonite Can					
P1404452-002.01	6.0 L Silonite Can					
P1404452-003.01	6.0 L Silonite Can					
P1404452-004.01	6.0 L Silonite Can					
P1404452-005.01	6.0 L Ambient Can					
P1404452-006.01	6.0 L Ambient Can					
P1404452-007.01	6.0 L Silonite Can					
P1404452-008.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): _____

Sample -017 is missing container tag.

ALS Environmental Sample Acceptance Check Form

Client: AMEC Environment & Infrastructure, Inc.

Work order: P1404452

Project: CTS of Asheville / 6252-12-0006

Sample(s) received on: 10/30/14

Date opened: 10/30/14 by: ADAVID

by: ADAVID

[illegible]

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO₂, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.
Client Sample ID: TB-04
Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452
 ALS Sample ID: P1404452-001

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19
Analyst: Wida Ang
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00760

Date Collected: 10/29/14
Date Received: 10/30/14
Date Analyzed: 11/4/14
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	0.0068	ND	0.0098	0.0027	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	0.0064	ND	0.0063	0.0016	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	0.0061	ND	0.0063	0.0015	
79-01-6	Trichloroethene	ND	0.025	0.0072	ND	0.0047	0.0013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: FD-09

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-002

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00744

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/4/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.07 Final Pressure (psig): 3.58

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.020	0.039	0.011	0.0078	0.015	0.0042	J
156-60-5	trans-1,2-Dichloroethene	0.011	0.039	0.010	0.0028	0.0099	0.0025	J
156-59-2	cis-1,2-Dichloroethene	0.92	0.039	0.0096	0.23	0.0099	0.0024	
79-01-6	Trichloroethene	0.090	0.039	0.011	0.017	0.0073	0.0021	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: FD-10

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-003

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00789

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 0.50 Liter(s)

Initial Pressure (psig): -4.04 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.030	0.086	0.023	0.012	0.034	0.0092	J
156-60-5	trans-1,2-Dichloroethene	ND	0.086	0.022	ND	0.022	0.0056	
156-59-2	cis-1,2-Dichloroethene	0.64	0.086	0.021	0.16	0.022	0.0053	
79-01-6	Trichloroethene	0.13	0.086	0.025	0.025	0.016	0.0046	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: FD-11

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-004

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00803

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/4/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.05 Final Pressure (psig): 3.52

Canister Dilution Factor: 1.44

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.015	0.036	0.0098	0.0060	0.014	0.0038	J
156-60-5	trans-1,2-Dichloroethene	ND	0.036	0.0092	ND	0.0091	0.0023	
156-59-2	cis-1,2-Dichloroethene	0.36	0.036	0.0088	0.092	0.0091	0.0022	
79-01-6	Trichloroethene	0.052	0.036	0.010	0.0096	0.0067	0.0019	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: CAS-07

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-006

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01940

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 0.50 Liter(s)

Initial Pressure (psig): -0.28 Final Pressure (psig): 4.03

Canister Dilution Factor: 1.30

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.065	0.018	ND	0.025	0.0069	
156-60-5	trans-1,2-Dichloroethene	ND	0.065	0.017	ND	0.016	0.0042	
156-59-2	cis-1,2-Dichloroethene	0.26	0.065	0.016	0.065	0.016	0.0040	
79-01-6	Trichloroethene	0.11	0.065	0.019	0.021	0.012	0.0035	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-07

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-007

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00791

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/4/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.18 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.27

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.012	0.032	0.0086	0.0048	0.012	0.0034	J
156-60-5	trans-1,2-Dichloroethene	ND	0.032	0.0081	ND	0.0080	0.0021	
156-59-2	cis-1,2-Dichloroethene	0.37	0.032	0.0077	0.093	0.0080	0.0020	
79-01-6	Trichloroethene	0.11	0.032	0.0091	0.020	0.0059	0.0017	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-14

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-008

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00798

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 0.50 Liter(s)

Initial Pressure (psig): -0.50 Final Pressure (psig): 3.93

Canister Dilution Factor: 1.31

CAS #	Compound	Result µg/m ³	MRL µg m ³	MDL µg m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.066	0.018	ND	0.026	0.0070	
156-60-5	trans-1,2-Dichloroethene	ND	0.066	0.017	ND	0.017	0.0042	
156-59-2	cis-1,2-Dichloroethene	0.56	0.066	0.016	0.14	0.017	0.0040	
79-01-6	Trichloroethene	0.061	0.066	0.019	0.011	0.012	0.0035	J

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-10

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-009

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01854

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/4/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.28 Final Pressure (psig): 3.58

Canister Dilution Factor: 1.47

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.015	0.037	0.010	0.0061	0.014	0.0039	J
156-60-5	trans-1,2-Dichloroethene	0.012	0.037	0.0094	0.0031	0.0093	0.0024	J
156-59-2	cis-1,2-Dichloroethene	0.90	0.037	0.0090	0.23	0.0093	0.0023	
79-01-6	Trichloroethene	0.089	0.037	0.011	0.017	0.0068	0.0020	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: IAS-10

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-010

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01157

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 0.50 Liter(s)

Initial Pressure (psig): -3.99 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.71

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.038	0.086	0.023	0.015	0.033	0.0091	J
156-60-5	trans-1,2-Dichloroethene	ND	0.086	0.022	ND	0.022	0.0055	
156-59-2	cis-1,2-Dichloroethene	0.74	0.086	0.021	0.19	0.022	0.0053	
79-01-6	Trichloroethene	0.22	0.086	0.025	0.041	0.016	0.0046	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-09

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-011

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC02022

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 0.50 Liter(s)

Initial Pressure (psig): -0.76 Final Pressure (psig): 3.56

Canister Dilution Factor: 1.31

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.066	0.018	ND	0.026	0.0070	
156-60-5	trans-1,2-Dichloroethene	ND	0.066	0.017	ND	0.017	0.0042	
156-59-2	cis-1,2-Dichloroethene	0.50	0.066	0.016	0.13	0.017	0.0040	
79-01-6	Trichloroethene	0.066	0.066	0.019	0.012	0.012	0.0035	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-08

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-012

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00795

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.25 Final Pressure (psig): 3.67

Canister Dilution Factor: 1.60

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.015	0.040	0.011	0.0059	0.016	0.0043	J
156-60-5	trans-1,2-Dichloroethene	ND	0.040	0.010	ND	0.010	0.0026	
156-59-2	cis-1,2-Dichloroethene	0.43	0.040	0.0098	0.11	0.010	0.0025	
79-01-6	Trichloroethene	0.085	0.040	0.012	0.016	0.0074	0.0021	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: IAS-08

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-013

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00796

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -1.87 Final Pressure (psig): 3.58

Canister Dilution Factor: 1.42

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.022	0.036	0.0097	0.0085	0.014	0.0038	J
156-60-5	trans-1,2-Dichloroethene	ND	0.036	0.0091	ND	0.0090	0.0023	
156-59-2	cis-1,2-Dichloroethene	0.65	0.036	0.0087	0.17	0.0090	0.0022	
79-01-6	Trichloroethene	0.14	0.036	0.010	0.026	0.0066	0.0019	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-13

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-014

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00763

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.83 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.70

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.019	0.043	0.012	0.0076	0.017	0.0045	J
156-60-5	trans-1,2-Dichloroethene	ND	0.043	0.011	ND	0.011	0.0027	
156-59-2	cis-1,2-Dichloroethene	0.80	0.043	0.010	0.20	0.011	0.0026	
79-01-6	Trichloroethene	0.087	0.043	0.012	0.016	0.0079	0.0023	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: CAS-13

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-015

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00804

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.43 Final Pressure (psig): 3.56

Canister Dilution Factor: 1.28

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.032	0.0087	ND	0.013	0.0034	
156-60-5	trans-1,2-Dichloroethene	ND	0.032	0.0082	ND	0.0081	0.0021	
156-59-2	cis-1,2-Dichloroethene	0.044	0.032	0.0078	0.011	0.0081	0.0020	
79-01-6	Trichloroethene	ND	0.032	0.0092	ND	0.0060	0.0017	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: CAS-11

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-016

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Summa Canister

Test Notes:

Container ID: AC01460

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -1.04 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.35

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.034	0.0092	ND	0.013	0.0036	
156-60-5	trans-1,2-Dichloroethene	ND	0.034	0.0086	ND	0.0085	0.0022	
156-59-2	cis-1,2-Dichloroethene	0.41	0.034	0.0082	0.10	0.0085	0.0021	
79-01-6	Trichloroethene	0.052	0.034	0.0097	0.0097	0.0063	0.0018	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-12

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-018

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00675

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -0.66 Final Pressure (psig): 3.82

Canister Dilution Factor: 1.32

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	0.017	0.033	0.0090	0.0068	0.013	0.0035	J
156-60-5	trans-1,2-Dichloroethene	0.013	0.033	0.0084	0.0032	0.0083	0.0021	J
156-59-2	cis-1,2-Dichloroethene	1.2	0.033	0.0081	0.30	0.0083	0.0020	
79-01-6	Trichloroethene	0.10	0.033	0.0095	0.019	0.0061	0.0018	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.
Client Sample ID: CAS-12
Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452
 ALS Sample ID: P1404452-019

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19
Analyst: Wida Ang
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00172

Date Collected: 10/29/14
Date Received: 10/30/14
Date Analyzed: 11/5/14
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -4.22 **Final Pressure (psig):** 3.86

Canister Dilution Factor: 1.77

CAS #	Compound	Result µg/m ³	MRL µg/m ³	MDL µg/m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.044	0.012	ND	0.017	0.0047	
156-60-5	trans-1,2-Dichloroethene	ND	0.044	0.011	ND	0.011	0.0029	
156-59-2	cis-1,2-Dichloroethene	0.60	0.044	0.011	0.15	0.011	0.0027	
79-01-6	Trichloroethene	0.066	0.044	0.013	0.012	0.0082	0.0024	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.
Client Sample ID: Method Blank
Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452
 ALS Sample ID: P141104-MB

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19
Analyst: Wida Ang
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/4/14
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg m ³	MDL µg m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	0.0068	ND	0.0098	0.0027	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	0.0064	ND	0.0063	0.0016	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	0.0061	ND	0.0063	0.0015	
79-01-6	Trichloroethene	ND	0.025	0.0072	ND	0.0047	0.0013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.
Client Sample ID: Method Blank
Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452
 ALS Sample ID: P141105-MB

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19
Analyst: Wida Ang
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/5/14
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m ³	MRL µg m ³	MDL µg m ³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
75-01-4	Vinyl Chloride	ND	0.025	0.0068	ND	0.0098	0.0027	
156-60-5	trans-1,2-Dichloroethene	ND	0.025	0.0064	ND	0.0063	0.0016	
156-59-2	cis-1,2-Dichloroethene	ND	0.025	0.0061	ND	0.0063	0.0015	
79-01-6	Trichloroethene	ND	0.025	0.0072	ND	0.0047	0.0013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.
Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 10/29/14
Date(s) Received: 10/30/14
Date(s) Analyzed: 11/4 - 11/5/14

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		% Recovered	% Recovered	% Recovered		
Method Blank	P141104-MB	94	103	97	70-130	
Method Blank	P141105-MB	91	105	98	70-130	
Lab Control Sample	P141104-LCS	97	98	109	70-130	
Lab Control Sample	P141105-LCS	93	102	105	70-130	
TB-04	P1404452-001	93	103	96	70-130	
FD-09	P1404452-002	91	105	97	70-130	
FD-10	P1404452-003	91	104	98	70-130	
FD-11	P1404452-004	92	106	101	70-130	
CAS-07	P1404452-006	92	101	98	70-130	
AAS-07	P1404452-007	91	106	99	70-130	
AAS-14	P1404452-008	92	100	98	70-130	
AAS-10	P1404452-009	91	106	99	70-130	
IAS-10	P1404452-010	91	105	97	70-130	
AAS-09	P1404452-011	92	102	94	70-130	
AAS-08	P1404452-012	92	98	97	70-130	
AAS-08	P1404452-012DUP	92	100	98	70-130	
IAS-08	P1404452-013	94	104	94	70-130	
AAS-13	P1404452-014	91	106	98	70-130	
CAS-13	P1404452-015	91	107	98	70-130	
CAS-11	P1404452-016	91	107	100	70-130	
AAS-12	P1404452-018	91	106	98	70-130	
CAS-12	P1404452-019	91	104	99	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: Lab Control Sample

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P141104-LCS

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 11/4/14

Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount µg m ⁻³	Result µg/m ³	% Recovery	ALS	Data Qualifier
					Acceptance Limits	
75-01-4	Vinyl Chloride	4.04	3.11	77	63-120	
156-60-5	trans-1,2-Dichloroethene	4.24	3.34	79	66-115	
156-59-2	cis-1,2-Dichloroethene	4.28	3.54	83	66-116	
79-01-6	Trichloroethene	4.16	3.33	80	66-116	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: Lab Control Sample

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P141105-LCS

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Date Collected: NA

Date Received: NA

Date Analyzed: 11/5/14

Volume(s) Analyzed: 0.125 Liter(s)

CAS #	Compound	Spike Amount µg m ⁻³	Result µg/m ³	% Recovery	ALS Acceptance Limits	Data Qualifier
75-01-4	Vinyl Chloride	4.04	3.37	83	63-120	
156-60-5	trans-1,2-Dichloroethene	4.24	3.54	83	66-115	
156-59-2	cis-1,2-Dichloroethene	4.28	3.78	88	66-116	
79-01-6	Trichloroethene	4.16	3.18	76	66-116	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Sample ID: AAS-08

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

ALS Sample ID: P1404452-012DUP

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Analyst: Wida Ang

Sample Type: 6.0 L Silonite Canister

Test Notes:

Container ID: AS00795

Date Collected: 10/29/14

Date Received: 10/30/14

Date Analyzed: 11/5/14

Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -3.25

Final Pressure (psig): 3.67

Canister Dilution Factor: 1.60

CAS #	Compound	Sample Result		Duplicate Sample Result		Average µg/m³	% RPD	RPD Limit	Data Qualifier
		µg/m³	ppbV	µg/m³	ppbV				
75-01-4	Vinyl Chloride	0.0152	0.00593	0.0143	0.00558	0.01475	6	25	J
156-60-5	trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
156-59-2	cis-1,2-Dichloroethene	0.432	0.109	0.445	0.112	0.4385	3	25	
79-01-6	Trichloroethene	0.0845	0.0157	0.0817	0.0152	0.0831	3	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.
Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

Method Blank Summary

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister(s)
Test Notes:

Lab File ID: 11041407.D
Date Analyzed: 11/4/14
Time Analyzed: 10:35

Client Sample ID	ALS Sample ID	Lab File ID	Time Analyzed
Lab Control Sample	P141104-LCS	11041408.D	11:02
TB-04	P1404452-001	11041416.D	17:33
FD-09	P1404452-002	11041417.D	18:01
FD-11	P1404452-004	11041419.D	19:00
AAS-07	P1404452-007	11041422.D	20:25
AAS-10	P1404452-009	11041424.D	21:20

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.
Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

Method Blank Summary

Test Code: EPA TO-15 SIM
Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister(s)
Test Notes:

Lab File ID: 11051403.D
Date Analyzed: 11/5/14
Time Analyzed: 00:06

Client Sample ID	ALS Sample ID	Lab File ID	Time Analyzed
Lab Control Sample	P141105-LCS	11051404.D	00:33
FD-10	P1404452-003	11051407.D	06:02
CAS-07	P1404452-006	11051409.D	06:57
AAS-14	P1404452-008	11051411.D	07:51
IAS-10	P1404452-010	11051412.D	08:19
AAS-09	P1404452-011	11051413.D	08:46
AAS-08	P1404452-012	11051417.D	11:10
AAS-08 (Lab Duplicate)	P1404452-012DUP	11051418.D	11:38
IAS-08	P1404452-013	11051419.D	12:07
AAS-13	P1404452-014	11051420.D	12:35
CAS-13	P1404452-015	11051421.D	13:03
CAS-11	P1404452-016	11051422.D	13:31
AAS-12	P1404452-018	11051424.D	14:29
CAS-12	P1404452-019	11051425.D	14:59

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Lab File ID: 11041402.D

Analyst: Wida Ang

Date Analyzed: 11/4/14

Sample Type: 6.0 L Summa Canister(s)

Time Analyzed: 05:24

Test Notes:

	IS1 (BCM)			IS2 (DFB)			IS3 (CBZ)		
	AREA	#	RT	AREA	#	RT	AREA	#	RT
24 Hour Standard	23552		6.13	114084		8.73	14356		13.14
Upper Limit	32973		6.46	159718		9.06	20098		13.47
Lower Limit	14131		5.80	68450		8.40	8614		12.81
Client Sample ID									
01	Method Blank		22024	6.15	92348	8.74	12261		13.14
02	Lab Control Sample		22747	6.13	108045	8.73	13372		13.14
03	TB-04		27464	6.15	130297	8.74	16775		13.14
04	FD-09		27875	6.13	134338	8.73	18326		13.14
05	FD-11		30239	6.13	154271	8.73	20036		13.14
06	AAS-07		30689	6.13	156494	8.73	20820	I	13.14
07	AAS-10		30387	6.13	154305	8.73	20609	I	13.14
08									
09									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits. See case narrative.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: AMEC Environment & Infrastructure, Inc.

Client Project ID: CTS of Asheville / 6252-12-0006

ALS Project ID: P1404452

Internal Standard Area and RT Summary

Test Code: EPA TO-15 SIM

Instrument ID: Tekmar AUTOCAN Agilent 5973N HP6890A MS19

Lab File ID: 11051402.D

Analyst: Wida Ang

Date Analyzed: 11/4/14

Sample Type: 6.0 L Summa Canister(s)

Time Analyzed: 23:36

Test Notes:

	IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
	AREA	#	RT	#	AREA	#
24 Hour Standard	29646	6.13	152779	8.73	19415	13.14
Upper Limit	41504	6.46	213891	9.06	27181	13.47
Lower Limit	17788	5.80	91667	8.40	11649	12.81

Client Sample ID		IS1 (BCM)		IS2 (DFB)		IS3 (CBZ)	
		AREA	#	RT	#	AREA	#
01	Method Blank	28097	6.14	133783	8.73	17246	13.14
02	Lab Control Sample	29841	6.13	151458	8.72	18622	13.14
03	FD-10	29601	6.14	148843	8.73	20321	13.13
04	CAS-07	29218	6.13	153059	8.73	19098	13.13
05	AAS-14	28316	6.14	145482	8.73	18013	13.13
06	IAS-10	29387	6.15	151816	8.74	19962	13.14
07	AAS-09	29752	6.13	156690	8.73	20190	13.14
08	AAS-08	21476	6.13	93064	8.73	13658	13.14
09	AAS-08 (Lab Duplicate)	22520	6.14	101509	8.73	14515	13.14
10	IAS-08	23963	6.15	118881	8.74	18819	13.14
11	AAS-13	29177	6.13	141429	8.73	19315	13.14
12	CAS-13	29315	6.14	148630	8.73	19416	13.14
13	CAS-11	29054	6.14	145689	8.73	19521	13.14
14	AAS-12	30293	6.14	153533	8.73	20168	13.14
15	CAS-12	29874	6.14	155940	8.73	20504	13.14
16							
17							
18							
19							
20							

IS1 (BCM) = Bromochloromethane

IS2 (DFB) = 1,4-Difluorobenzene

IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area

AREA LOWER LIMIT = 60% of internal standard area

RT UPPER LIMIT = 0.33 minutes of internal standard RT

RT LOWER LIMIT = 0.33 minutes of internal standard RT

Column used to flag values outside QC limits with an I.

I = Internal standard not within the specified limits. See case narrative.

Response Factor Report MS19

Method Path : I:\MS19\METHODS\
 Method File : X19103114A.M
 Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
 Last Update : Sat Nov 01 11:07:01 2014
 Response Via : Initial Calibration

Calibration Files

10 =10311415.D 20 =10311416.D 50 =10311417.D 100 =10311418.D 500 =10311419.D 1000=10311420.D
 2500=10311421.D 20K =10311422.D 50K =10311423.D

Compound			10	20	50	100	500	1000	2500	20K	50K	Avg	%RSD

1)	I	Bromochloromethane...	-----ISTD-----										
2)	T	Dichlorodifluo...	3.709	2.923	3.081	2.600	2.573	2.679	2.673			2.891	14.01
3)	T	Chloromethane	0.896	0.643	0.628	0.510	0.488	0.367	0.552			0.584	28.46
4)	T	Vinyl Chloride	2.494	1.757	1.773	1.485	1.535	1.641	1.633			1.760	19.35
5)	T	Bromomethane	1.604	1.063	1.135	0.848	0.829	0.868	0.955			1.043	26.15
6)	T	Chloroethane	1.086	0.767	0.769	0.640	0.636	0.687	0.677			0.751	20.89
7)	T	Acetone			0.779	0.569	0.573	0.426	0.598			0.589	21.41
8)	T	Trichlorofluor...	2.708	2.017	2.111	1.790	1.743	1.630	1.839			1.977	18.27
9)	T	1,1-Dichloroet...	1.697	1.198	1.227	1.060	1.021	1.050	1.088			1.192	19.81
10)	T	Methylene Chlo...	2.040	1.289	1.353	1.081	0.989	1.021	1.013			1.255	29.83
11)	T	Trichlorotrifl...	2.110	1.504	1.554	1.265	1.182	1.186	1.237			1.434	23.28
12)	T	trans-1,2-Dich...	1.666	1.238	1.258	1.072	1.083	1.097	1.213			1.232	16.73
13)	T	1,1-Dichloroet...	2.675	1.939	2.090	1.741	1.714	1.665	1.838			1.952	17.97
14)	T	Methyl tert-Bu...	3.559	2.737	2.691	2.405	2.600	2.922	3.219			2.876	13.75
15)	T	cis-1,2-Dichlo...	1.487	1.136	1.222	1.082	1.080	1.112	1.311			1.204	12.46
16)	T	Chloroform	2.857	2.096	2.305	1.932	1.853	1.784	2.001			2.118	17.37
17)	S	1,2-Dichloroet...	1.531	1.535	1.539	1.548	1.520	1.511	1.488			1.525	1.33
18)	T	1,2-Dichloroet...	1.893	1.461	1.617	1.405	1.366	1.350	1.475			1.509	12.65
19)	T	1,1,1-Trichlor...	2.695	2.069	2.211	1.872	1.828	1.852	1.969			2.071	14.83
20)	T	Benzene	5.704	4.051	4.418	3.628	3.647	3.545	4.302			4.185	17.99
21)	T	Carbon Tetrach...	1.821	1.465	1.657	1.532	1.518	1.571	1.727			1.613	7.89
22)	I	1,4-Difluorobenzen...	-----ISTD-----										
23)	T	1,2-Dichloropr...	0.314	0.237	0.255	0.210	0.207	0.169	0.240			0.233	19.46
24)	T	Bromodichlorom...	0.475	0.362	0.401	0.327	0.322	0.299	0.364			0.364	16.21
25)	T	Trichloroethene	0.374	0.287	0.319	0.269	0.264	0.260	0.327			0.300	13.99
26)	T	1,4-Dioxane	0.193	0.144	0.167	0.155	0.166	0.158	0.228			0.173	16.60
27)	T	cis-1,3-Dichlo...	0.339	0.269	0.306	0.276	0.288	0.281	0.414			0.310	16.59
28)	T	trans-1,3-Dich...	0.267	0.220	0.249	0.240	0.256	0.258	0.386			0.268	20.22
29)	T	1,1,2-Trichlor...	0.273	0.209	0.237	0.195	0.193	0.144	0.227			0.211	19.16
30)	S	Toluene-d8 (SS2)	0.873	0.870	0.856	0.854	0.883	0.820	0.942			0.871	4.30
31)	T	Toluene	1.196	0.896	1.013	0.868	0.892	0.754	1.138			0.965	16.37
32)	T	1,2-Dibromoethane	0.319	0.253	0.292	0.254	0.258	0.214	0.323			0.273	14.43
33)	T	Tetrachloroethene	0.446	0.352	0.417	0.360	0.358	0.334	0.414			0.383	10.98
34)	I	Chlorobenzene-d5 (...)	-----ISTD-----										
35)	T	Chlorobenzene	6.554	4.999	5.932	4.950	4.840	4.689	5.378			5.335	12.73
36)	T	Ethylbenzene	7.531	5.741	6.654	6.211	6.614	7.264	8.901			6.988	14.83
37)	T	m,p-Xylene	5.501	4.309	5.231	5.573	6.010	6.336	7.344			5.758	16.46

Method Path : I:\MS19\METHODS\

Method File : X19103114A.M

Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

38)	T	o-Xylene	2.869	2.286	2.795	2.990	3.147	3.237	3.846	3.024	15.74
39)	T	1,1,2,2-Tetrac...	4.277	3.264	3.964	3.260	3.192	3.219	3.573	3.536	12.13
40)	S	Bromofluoroben...	3.084	3.157	3.200	3.308	3.319	3.224	3.277	3.224	2.64
41)	T	1,3-Dichlorobe...	5.215	4.043	5.474	4.897	4.865	5.156	5.417	5.010	9.69
42)	T	1,4-Dichlorobe...	5.579	4.224	5.805	5.331	5.282	5.546	5.780	5.364	10.08
43)	T	1,2-Dichlorobe...	5.352	4.063	5.493	4.800	4.773	5.059	5.238	4.968	9.69
44)	T	1,2,4-Trichlor...	3.510	2.550	3.241	2.990	3.170	3.645	3.766	3.267	12.82
45)	T	Naphthalene	0.898	0.635	0.753	0.796	0.952	1.179	1.131	0.906	E1 21.89
46)	T	Hexachlorobuta...	2.843	2.296	2.871	2.391	2.337	2.541	2.482	2.537	9.21

(#) = Out of Range

TO-15 (SIM) INITIAL CALIBRATION CONCENTRATIONS

0.2ng/L Working Standard ID: **S29-10281405**

20ng/L Working Standard ID:

0

4ng/L Working Standard ID: **S29-10231409**

50ng/L Working Standard ID:

0

5ng/L Working Standard ID:

0

200ng/L Working Standard ID: **S29-10231404**

Std. Canister Utilized (ng/L) Injection Amt(mL)	0.2 50	0.2 100	0.2 250	5 20	5 100	20 50	20 125	200 50	200 100	200 250
Compound Name	Conc. 10pg	Conc. 20pg	Conc. 50pg	Conc. 100pg	Conc. 500pg	Conc. 1000pg	Conc. 2500pg	Conc. 10,000pg	Conc. 20,000pg	Conc. 50,000pg
Freon-12	9.50	19.00	47.50	95.0	475	950	2375	9500	19000	47500
Chloromethane	10.10	20.20	50.50	101.0	505	1010	2525	10100	20200	50500
Vinyl Chloride	10.00	20.00	50.00	100.0	500	1000	2500	10000	20000	50000
1,3-Butadiene	10.40	20.80	52.00	104.0	520	1040	2600	10400	20800	52000
Bromomethane	10.20	20.40	51.00	102.0	510	1020	2550	10200	20400	51000
Chloroethane	10.10	20.20	50.50	101.0	505	1010	2525	10100	20200	50500
Acrolein	11.30	22.60	56.50	113.0	565	1130	2825	11300	22600	56500
Acetone	54.60	109.20	273.00	546.0	2730	5460	13650	54600	109200	273000
Freon-11	10.80	21.60	54.00	108.0	540	1080	2700	10800	21600	54000
1,1-Dichloroethene	10.90	21.80	54.50	109.0	545	1090	2725	10900	21800	54500
Methylene Chloride	11.30	22.60	56.50	113.0	565	1130	2825	11300	22600	56500
Freon-113	10.90	21.80	54.50	109.0	545	1090	2725	10900	21800	54500
trans-1,2-Dichloroethene	10.60	21.20	53.00	106.0	530	1060	2650	10600	21200	53000
1,1-Dichloroethane	10.70	21.40	53.50	107.0	535	1070	2675	10700	21400	53500
Methyl tert-Butyl Ether	10.90	21.80	54.50	109.0	545	1090	2725	10900	21800	54500
cis-1,2-Dichloroethene	11.00	22.00	55.00	110.0	550	1100	2750	11000	22000	55000
Chloroform	11.20	22.40	56.00	112.0	560	1120	2800	11200	22400	56000
1,2-Dichloroethane	10.80	21.60	54.00	108.0	540	1080	2700	10800	21600	54000
1,1,1-Trichloroethane	10.50	21.00	52.50	105.0	525	1050	2625	10500	21000	52500
Benzene	11.30	22.60	56.50	113.0	565	1130	2825	11300	22600	56500
Carbon Tetrachloride	11.50	23.00	57.50	115.0	575	1150	2875	11500	23000	57500
1,2-Dichloropropane	10.90	21.80	54.50	109.0	545	1090	2725	10900	21800	54500
Bromodichloromethane	10.90	21.80	54.50	109.0	545	1090	2725	10900	21800	54500
Trichloroethene	10.80	21.60	54.00	108.0	540	1080	2700	10800	21600	54000
1,4-Dioxane	10.90	21.80	54.50	109.0	545	1090	2725	10900	21800	54500
cis-1,3-Dichloropropene	10.50	21.00	52.50	105.0	525	1050	2625	10500	21000	52500
trans-1,3-Dichloropropene	10.60	21.20	53.00	106.0	530	1060	2650	10600	21200	53000
1,1,2-Trichloroethane	10.90	21.80	54.50	109.0	545	1090	2725	10900	21800	54500
Toluene	11.00	22.00	55.00	110.0	550	1100	2750	11000	22000	55000
1,2-Dibromoethane	11.00	22.00	55.00	110.0	550	1100	2750	11000	22000	55000
Tetrachloroethene	10.10	20.20	50.50	101.0	505	1010	2525	10100	20200	50500
Chlorobenzene	11.10	22.20	55.50	111.0	555	1110	2775	11100	22200	55500
Ethylbenzene	11.00	22.00	55.00	110.0	550	1100	2750	11000	22000	55000
m,p-Xylenes	21.60	43.20	108.00	216.0	1080	2160	5400	21600	43200	108000
o-Xylene	10.60	21.20	53.00	106.0	530	1060	2650	10600	21200	53000
1,1,2,2-Tetrachloroethane	10.50	21.00	52.50	105.0	525	1050	2625	10500	21000	52500
1,3-Dichlorobenzene	11.40	22.80	57.00	114.0	570	1140	2850	11400	22800	57000
1,4-Dichlorobenzene	10.60	21.20	53.00	106.0	530	1060	2650	10600	21200	53000
1,2-Dichlorobenzene	11.10	22.20	55.50	111.0	555	1110	2775	11100	22200	55500
1,2-Dibromo-3-chloropropane	11.00	22.00	55.00	110.0	550	1100	2750	11000	22000	55000
1,2,4-Trichlorobenzene	11.30	22.60	56.50	113.0	565	1130	2825	11300	22600	56500
Naphthalene	11.10	22.20	55.50	111.0	555	1110	2775	11100	22200	55500
Hexachloro-1,3-butadiene	11.20	22.40	56.00	112.0	560	1120	2800	11200	22400	56000

11/3/14

Data File : I:\MS19\DATA\2014_11\04\11041402.D
 Acq On : 4 Nov 2014 5:24
 Sample : 500pg TO-15SIM CCV STD
 Misc : S29-10101402/S29-10231409 (11/22)

Vial: 16
 Operator: WA/LC
 Inst : MS19

Quant Time: Nov 06 06:19:19 2014
 Quant Method : I:\MS19\METHODS\X19103114A.M
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
 QLast Update : Sat Nov 01 11:07:01 2014
 Response via : Initial Calibration
 DataAcq Meth:TO15SIM.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
 Max. RRF Dev : 30% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 I	Bromochloromethane (IS1)	1.000	1.000	0.0	124	-0.01
2 T	Dichlorodifluoromethane (CF	2.891	2.540	12.1	121	-0.02
3 T	Chloromethane	0.584	0.543	7.0	132	-0.02
4 T	Vinyl Chloride	1.760	1.612	8.4	135	-0.03
5 T	Bromomethane	1.043	0.902	13.5	132	-0.02
6 T	Chloroethane	0.751	0.700	6.8	136	-0.02
7 T	Acetone	0.589	0.646	-9.7	141	-0.05
8 T	Trichlorofluoromethane	1.977	1.714	13.3	119	-0.02
9 T	1,1-Dichloroethene	1.192	1.075	9.8	126	-0.02
10 T	Methylene Chloride	1.255	1.109	11.6	127	-0.02
11 T	Trichlorotrifluoroethane	1.434	1.226	14.5	120	-0.01
12 T	trans-1,2-Dichloroethene	1.232	1.109	10.0	128	-0.02
13 T	1,1-Dichloroethane	1.952	1.793	8.1	128	-0.01
14 T	Methyl tert-Butyl Ether	2.876	2.592	9.9	134	-0.07
15 T	cis-1,2-Dichloroethene	1.204	1.134	5.8	130	-0.01
16 T	Chloroform	2.118	1.890	10.8	122	0.00
17 S	1,2-Dichloroethane-d4 (SS1)	1.525	1.477	3.1	118	-0.01
18 T	1,2-Dichloroethane	1.509	1.331	11.8	118	-0.01
19 T	1,1,1-Trichloroethane	2.071	1.792	13.5	119	0.00
20 T	Benzene	4.185	3.844	8.1	132	-0.01
21 T	Carbon Tetrachloride	1.613	1.432	11.2	116	0.00
22 I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	130	0.00
23 T	1,2-Dichloropropane	0.233	0.209	10.3	129	0.00
24 T	Bromodichloromethane	0.364	0.303	16.8	120	-0.01
25 T	Trichloroethene	0.300	0.255	15.0	123	0.00
26 T	1,4-Dioxane	0.173	0.159	8.1	134	-0.07
27 T	cis-1,3-Dichloropropene	0.310	0.279	10.0	131	-0.01
28 T	trans-1,3-Dichloropropene	0.268	0.238	11.2	128	-0.01
29 T	1,1,2-Trichloroethane	0.211	0.187	11.4	125	0.00
30 S	Toluene-d8 (SS2)	0.871	0.851	2.3	130	0.00
31 T	Toluene	0.965	0.867	10.2	130	0.00
32 T	1,2-Dibromoethane	0.273	0.243	11.0	124	0.00
33 T	Tetrachloroethene	0.383	0.332	13.3	120	0.00
34 I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	120	0.00
35 T	Chlorobenzene	5.335	5.108	4.3	124	0.00
36 T	Ethylbenzene	6.988	6.911	1.1	134	0.00
37 T	m,p-Xylene	5.758	6.008	-4.3	129	0.00
38 T	o-Xylene	3.024	3.193	-5.6	128	0.00
39 T	1,1,2,2-Tetrachloroethane	3.536	3.344	5.4	123	0.00
40 S	Bromofluorobenzene (SS3)	3.224	3.254	-0.9	118	0.00
41 T	1,3-Dichlorobenzene	5.010	4.823	3.7	118	0.00
42 T	1,4-Dichlorobenzene	5.364	5.201	3.0	117	0.00
43 T	1,2-Dichlorobenzene	4.968	4.692	5.6	117	0.00
44 T	1,2,4-Trichlorobenzene	3.267	2.966	9.2	119	0.00
45 T	Naphthalene	9.062	8.225	9.2	124	0.00
46 T	Hexachlorobutadiene	2.537	2.246	11.5	113	0.00

(#) = Out of Range

SPCC's out = 0 CCC's out = 0

11/6/14

Evaluate Continuing Calibration Report

Data File : I:\MS19\DATA\2014_11\05\11051402.D
 Acq On : 4 Nov 2014 23:36
 Sample : 500pg TO-15SIM CCV STD
 Misc : S29-10101402/S29-10231409 (11/22)

Vial: 16
 Operator: WA/LC
 Inst : MS19

Quant Time: Nov 06 07:27:14 2014
 Quant Method : I:\MS19\METHODS\X19103114A.M
 Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
 QLast Update : Sat Nov 01 11:07:01 2014
 Response via : Initial Calibration
 DataAcq Meth:TO15SIM.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
 Max. RRF Dev : 30% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1 I	Bromochloromethane (IS1)	1.000	1.000	0.0	156	-0.01
2 T	Dichlorodifluoromethane (CF	2.891	2.402	16.9	144	-0.02
3 T	Chloromethane	0.584	0.551	5.7	169	-0.02
4 T	Vinyl Chloride	1.760	1.671	5.1	176	-0.03
5 T	Bromomethane	1.043	0.924	11.4	170	-0.03
6 T	Chloroethane	0.751	0.750	0.1	183	-0.02
7 T	Acetone	0.589	0.698	-18.5	192	-0.05
8 T	Trichlorofluoromethane	1.977	1.632	17.5	142	-0.02
9 T	1,1-Dichloroethene	1.192	1.103	7.5	163	-0.02
10 T	Methylene Chloride	1.255	1.119	10.8	162	-0.02
11 T	Trichlorotrifluoroethane	1.434	1.168	18.5	144	-0.01
12 T	trans-1,2-Dichloroethene	1.232	1.141	7.4	166	-0.02
13 T	1,1-Dichloroethane	1.952	1.846	5.4	166	-0.02
14 T	Methyl tert-Butyl Ether	2.876	2.890	-0.5	188	-0.07
15 T	cis-1,2-Dichloroethene	1.204	1.190	1.2	172	-0.01
16 T	Chloroform	2.118	1.846	12.8	149	0.00
17 S	1,2-Dichloroethane-d4 (SS1)	1.525	1.425	6.6	144	0.00
18 T	1,2-Dichloroethane	1.509	1.280	15.2	142	-0.01
19 T	1,1,1-Trichloroethane	2.071	1.744	15.8	146	0.00
20 T	Benzene	4.185	4.156	0.7	179	0.00
21 T	Carbon Tetrachloride	1.613	1.343	16.7	137	0.00
22 I	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	174	0.00
23 T	1,2-Dichloropropane	0.233	0.207	11.2	172	-0.01
24 T	Bromodichloromethane	0.364	0.277	23.9	147	-0.01
25 T	Trichloroethene	0.300	0.247	17.7	160	-0.01
26 T	1,4-Dioxane	0.173	0.167	3.5	188	-0.07
27 T	cis-1,3-Dichloropropene	0.310	0.287	7.4	181	-0.01
28 T	trans-1,3-Dichloropropene	0.268	0.241	10.1	174	-0.01
29 T	1,1,2-Trichloroethane	0.211	0.179	15.2	160	0.00
30 S	Toluene-d8 (SS2)	0.871	0.892	-2.4	182	0.00
31 T	Toluene	0.965	0.873	9.5	175	0.00
32 T	1,2-Dibromoethane	0.273	0.230	15.8	157	0.00
33 T	Tetrachloroethene	0.383	0.300	21.7	145	0.00
34 I	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	162	0.00
35 T	Chlorobenzene	5.335	4.871	8.7	160	0.00
36 T	Ethylbenzene	6.988	7.137	-2.1	187	0.00
37 T	m,p-Xylene	5.758	6.003	-4.3	175	0.00
38 T	o-Xylene	3.024	3.134	-3.6	170	0.00
39 T	1,1,2,2-Tetrachloroethane	3.536	3.061	13.4	152	0.00
40 S	Bromofluorobenzene (SS3)	3.224	3.239	-0.5	159	0.00
41 T	1,3-Dichlorobenzene	5.010	4.336	13.5	144	0.00
42 T	1,4-Dichlorobenzene	5.364	4.661	13.1	142	0.00
43 T	1,2-Dichlorobenzene	4.968	4.208	15.3	142	0.00
44 T	1,2,4-Trichlorobenzene	3.267	2.815	13.8	153	0.00
45 T	Naphthalene	9.062	8.412	7.2	172	0.00
46 T	Hexachlorobutadiene	2.537	1.934	23.8	131	0.00

(#) = Out of Range

SPCC's out = 0 CCC's out = 0

APPENDIX E

DATA VALIDATION REPORT

DATA VALIDATION REPORT

CTS of Asheville, Inc. Superfund Site

Asheville, North Carolina

Introduction

Air samples were collected at the CTS of Asheville, Inc. Superfund Site (Site) in Asheville, North Carolina in October 2014 and submitted for off-site laboratory analysis. Samples were analyzed by ALS Environmental in Simi Valley, California. Results were reported in Sample Delivery Group (SDG) P1404452.

A listing of samples included in this Data Validation Report is presented in Table E.1. A summary of the analytical results is presented in Table E.2. Samples were analyzed by the following method:

- Volatile organic compounds (VOCs) by USEPA Method TO-15 (project list only)

Deliverables for the off-site laboratory analyses included a Level IV data package.

Data validation was completed based on procedures in the USEPA Region 4 Data Validation Standard Operating Procedures (Region 4 SOP) for Organic Analysis (USEPA, 2008), in conjunction with the laboratory's Method TO-15 Selective Ion Monitoring (SIM) SOP (ALS, 2014) and the CTS of Asheville, Inc. Superfund Site Quality Assurance Project Plan (QAPP), Revision 4 (Amec, 2014). Quality control limits listed in the Region 4 SOP and QAPP were used during the data evaluation. The validation included the following evaluations:

- Lab report narrative
- Sample collection and chain of custody
- Data package completeness
- Holding times
- Quality control data (blanks, instrument tune and calibrations, lab control samples, duplicates, and surrogate recovery)
- Internal standard response and retention time
- Data transcription
- Calculations
- Electronic data reporting
- Data qualification

The following laboratory or data validation qualifiers are used in the final data presentation.

U = target analyte is not detected at the reported detection limit

J = concentration is estimated

Results are interpreted to be usable as reported by the laboratory unless discussed in the following sections.

Data Validation Results

No data validation qualification actions were required during this review. Several data validation observations are discussed below.

Field Duplicates

A summary of field duplicate results is presented on Table E.3. Good agreement was observed for target analytes in both field duplicate pairs. Relative percent differences (RPDs) between results were less than the QAPP-specified control limit of 50.

Sample Reporting

A compound list of project-specific TO-15 compounds (cis-1,2-dichloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride) was reported in the data set.

References

ALS Environmental, 2014. Standard Operating Procedure for Determination of Volatile Organic Compounds in Air Samples Collected in Specially Prepared Canisters and Gas Collection Bags by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 21.0, February 15, 2014.

Amec, 2014. Vapor Intrusion Assessment Work Plan: Quality Assurance Project Plan (Revision 4), March 14, 2014.

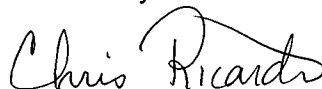
USEPA, 2008. Data Validation Standard Operating Procedures for Organic Analyses, USEPA Region 4, Science and Ecosystem Support Division Quality Assurance Section, MTSB, Revision 3.1, Athens, Georgia, August 2008.

Data Validator: Julie Ricardi



Date: 12/1/2014

Reviewed by Chris Ricardi, NRCC-EAC



Date: 12/5/2014

TABLE E.1
Data Validation Report: Sample Summary
CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Project 6252-12-0060

Location	Field Sample ID	SDG	Sample Date	Lab Sample ID
QC	TB-04	P1404452	10/29/2014	P1404452-001
AAS-14	FD-09	P1404452	10/29/2014	P1404452-002
IAS-08	FD-10	P1404452	10/29/2014	P1404452-003
CAS-11	FD-11	P1404452	10/29/2014	P1404452-004
CAS-07	CAS-07	P1404452	10/29/2014	P1404452-006
AAS-07	AAS-07	P1404452	10/29/2014	P1404452-007
AAS-14	AAS-14	P1404452	10/29/2014	P1404452-008
AAS-10	AAS-10	P1404452	10/29/2014	P1404452-009
IAS-10	IAS-10	P1404452	10/29/2014	P1404452-010
AAS-09	AAS-09	P1404452	10/29/2014	P1404452-011
AAS-08	AAS-08	P1404452	10/29/2014	P1404452-012
IAS-08	IAS-08	P1404452	10/29/2014	P1404452-013
AAS-13	AAS-13	P1404452	10/29/2014	P1404452-014
CAS-13	CAS-13	P1404452	10/29/2014	P1404452-015
CAS-11	CAS-11	P1404452	10/29/2014	P1404452-016
AAS-12	AAS-12	P1404452	10/29/2014	P1404452-018
CAS-12	CAS-12	P1404452	10/29/2014	P1404452-019

Prepared By: WCG 11/24/14

Checked By: JAR 12/1/14

TABLE E.2
Data Validation Report: Sample Result Summary
CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Project 6252-12-0006

Location Sample Date Field Sample ID		AAS-07 10/29/14 AAS-07		AAS-08 10/29/14 AAS-08		AAS-09 10/29/14 AAS-09		AAS-10 10/29/14 AAS-10		AAS-12 10/29/14 AAS-12		AAS-13 10/29/14 AAS-13	
Method	Parameter	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
TO-15 SIM	cis-1,2-Dichloroethene	0.37		0.43		0.5		0.9		1.2		0.8	
TO-15 SIM	trans-1,2-Dichloroethene	0.032	U	0.04	U	0.066	U	0.012	J	0.013	J	0.043	U
TO-15 SIM	Trichloroethene	0.11		0.085		0.066		0.089		0.1		0.087	
TO-15 SIM	Vinyl chloride	0.012	J	0.015	J	0.066	U	0.015	J	0.017	J	0.019	J

Location Sample Date Field Sample ID		AAS-14 10/29/14 AAS-14		AAS-14 10/29/14 FD-09		CAS-07 10/29/14 CAS-07		CAS-11 10/29/14 CAS-11		CAS-11 10/29/14 FD-11		CAS-12 10/29/14 CAS-12	
Method	Parameter	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
TO-15 SIM	cis-1,2-Dichloroethene	0.56		0.92		0.26		0.41		0.36		0.6	
TO-15 SIM	trans-1,2-Dichloroethene	0.066	U	0.011	J	0.065	U	0.034	U	0.036	U	0.044	U
TO-15 SIM	Trichloroethene	0.061	J	0.09		0.11		0.052		0.052		0.066	
TO-15 SIM	Vinyl chloride	0.066	U	0.02	J	0.065	U	0.034	U	0.015	J	0.044	U

Location Sample Date Field Sample ID		CAS-13 10/29/14 CAS-13		IAS-08 10/29/14 FD-10		IAS-08 10/29/14 IAS-08		IAS-10 10/29/14 IAS-10		QC 10/29/14 TB-04	
Method	Parameter	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
TO-15 SIM	cis-1,2-Dichloroethene	0.044		0.64		0.65		0.74		0.025	U
TO-15 SIM	trans-1,2-Dichloroethene	0.032	U	0.086	U	0.036	U	0.086	U	0.025	U
TO-15 SIM	Trichloroethene	0.032	U	0.13		0.14		0.22		0.025	U
TO-15 SIM	Vinyl chloride	0.032	U	0.03	J	0.022	J	0.038	J	0.025	U

Notes:

1. Concentrations are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
2. U - constituent not detected at the reporting limit.
3. J - concentration is estimated.

Prepared By: KMS 12/4/14

Checked By: JAR 12/4/14

TABLE E.3
Data Validation Report: Field Duplicate RPD Results
CTS of Asheville, Inc. Superfund Site
Asheville, North Carolina
Amec Project 6252-12-0006

Sample ID	Constituent	Field Sample Result	Flag	Duplicate Sample Result	Flag	RPD (%)
AAS-14/FD-09	cis-1,2-Dichloroethene	0.56		0.92		49
AAS-14/FD-09	trans-1,2-Dichloroethene	0.066	U	0.011	J	NC
AAS-14/FD-09	Trichloroethene	0.061	J	0.09		38
AAS-14/FD-09	Vinyl chloride	0.066	U	0.02	J	NC
IAS-08/FD-10	cis-1,2-Dichloroethene	0.65		0.64		2
IAS-08/FD-10	trans-1,2-Dichloroethene	0.036	U	0.086	U	NC
IAS-08/FD-10	Trichloroethene	0.14		0.13		7
IAS-08/FD-10	Vinyl chloride	0.022	J	0.03	J	NC
CAS-11/FD-11	cis-1,2-Dichloroethene	0.41		0.36		13
CAS-11/FD-11	trans-1,2-Dichloroethene	0.034	U	0.036	U	NC
CAS-11/FD-11	Trichloroethene	0.052		0.052		0
CAS-11/FD-11	Vinyl chloride	0.034	U	0.015	J	NC

Notes:

1. Concentrations are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
2. RPD - relative percent difference (between duplicate results).
3. U - constituent not detected at the reported detection limit.
4. J - estimated value
5. NC = not calculated; results are non-detect or below reporting limit

Prepared By: JAR 12/1/14

Checked By: CSR 12/3/14

APPENDIX F

RISK ASSESSMENT CALCULATION TABLES

TABLE F.1
Summary of Laboratory Analytical Results

INDOOR AIR SAMPLES

Address	Sample ID	TCE	cis-1,2-DCE	trans-1,2-DCE	VC
(b)(6)	IAS-10	0.22	0.74	<0.022	0.038 J
	IAS-08	0.14	0.65	<0.0091	0.022 J
	FD-10 (IAS-08)	0.13	0.64	<0.022	0.030 J
Target Indoor VISL / Residential Air RSL		0.21	NE	NE	0.17

Notes:

1. Concentrations in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).
2. TCE = trichloroethene; cis-1,2-DCE = cis-1,2-dichloroethene; trans-1,2-DCE = trans-1,2-dichloroethene; VC = vinyl chloride
3. VISL - Vapor Intrusion Screening Level calculated using the USEPA Office of Solid Waste and Emergency Response VISL Calculator (Version 3.2.1, F for residential land use assuming 10^{-6} target risk and 0.1 target hazard quotient.
4. RSL - Regional Screening Level for Residential Air, November 2014.
5. NE - a screening level has not been established for constituent.
6. Bold value indicates concentration greater than Target Residential Indoor VISL.
7. J - Estimated concentration
8. '<' - Constituent not detected at or above indicated laboratory reporting limit.

Prepared By: SEK 11/17/14

Checked By: LMS 12/15/14

TABLE F.2
Calculations of Risk to Indoor Air Concentrations – (b)(6)
Adult Resident (Current and Future)
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m ³)	Exposure Value Type ⁽¹⁾	Exposure Concentration ⁽²⁾			Toxicity Values			Source	Hazard Quotient ⁽⁴⁾ (Unitless)	Kidney Excess Cancer Risk ⁽⁵⁾ (Unitless)	Liver Excess Cancer Risk ⁽⁶⁾ (Unitless)	Total Excess Cancer Risk ⁽⁷⁾ (Unitless)
			Noncarcinogen (ug/m ³)	Mutagenic ⁽³⁾ (ug/m ³)	Carcinogen (ug/m ³)	Inhalation RFC (mg/m ³)	Inhalation Kidney Mutagenic Unit Risk (ug/m ³) ¹	Inhalation Liver Unit Risk (ug/m ³) ¹					
Trichloroethylene	0.22	Sampled	2.1E-01	2.2E-01	7.8E-02	2.0E-03	1.0E-06	3.1E-06	IRIS	0.1	2.2E-07	2.4E-07	5E-07

Notes:

m = cubic meters

mg = milligram

RfC = Reference Concentration

ug = micrograms

IRIS = Integrated Risk Information System (TCE data most recently revised September 28, 2011)

⁽¹⁾ Concentration detected in indoor air (IAS-10).

⁽²⁾ Exposure Concentration = See Equations below

⁽³⁾ Mutagenic risk for TCE includes age-adjusted risk for ages 0 to 26 years.

⁽⁴⁾ Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg

⁽⁵⁾ Kidney Excess Cancer Risk = Mutagenic Exposure Concentration x Inhalation Kidney Mutagenic Unit Risk

⁽⁶⁾ Liver Excess Cancer Risk = Carcinogenic Exposure Concentration x Inhalation Liver Unit Risk

⁽⁷⁾ Total Excess Cancer Risk = Kidney Excess Cancer Risk + Liver Excess Cancer Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/ AT, where:

Mutagenic Exposure Concentration = CA x ET x EF x ((ED2 x AF2)+(ED4 x AF4)+(ED10 x AF10)+(ED16 x AF16)) / ATc where:

Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc}, where:

CA = Constituent Concentration in Air (estimated) See above (ug/m³)

ET = Exposure Time (hours per day) 24 (hours/day)

EF = Exposure Frequency (days per year) 350 (days/year)

ED = Exposure Duration (years) 26 (years)

ED2 = Exposure Duration 2 (mutagen) 2 (years)

ED4 = Exposure Duration 4 (mutagen) 4 (years)

ED10 = Exposure Duration 10 (mutagen) 10 (years)

ED16 = Exposure Duration ≥16 (mutagen) 10 (years)

AF2 = Age-Dependent Adjustment Factor 10

AF4 = Age-Dependent Adjustment Factor 3

AF10 = Age-Dependent Adjustment Factor 3

AF16 = Age-Dependent Adjustment Factor 1

AT_{nc} = Averaging Time (Noncarcinogen, hours) 227,760

AT_c = Averaging Time (Carcinogenic, hours) 613,200

Prepared By: SEK 11/18/14

Checked By: LMS 12/15/14

TABLE F.3
Calculations of Risk to Indoor Air Concentrations – (b)(6)
Child Resident (Current and Future)
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m ³)	Exposure Value Type ⁽¹⁾	Exposure Concentration ⁽²⁾			Toxicity Values			Source	Hazard Quotient ⁽³⁾ (Unitless)	Kidney Excess Cancer Risk ⁽⁴⁾ (Unitless)	Liver Excess Cancer Risk ⁽⁵⁾ (Unitless)	Total Excess Cancer Risk ⁽⁶⁾ (Unitless)
			Noncarcinogen (ug/m ³)	Mutagenic (ug/m ³)	Carcinogen (ug/m ³)	Inhalation RfC (mg/m ³)	Inhalation Kidney Mutagenic Unit Risk (ug/m ³) ¹	Inhalation Liver Unit Risk (ug/m ³) ¹					
Trichloroethylene	0.22	Sampled	2.1E-01	9.6E-02	1.8E-02	2.0E-03	1.0E-06	3.1E-06	IRIS	0.1	9.6E-08	5.6E-08	2E-07

Notes:

m³ = cubic meters

mg = milligram

RfC = Reference Concentration

ug = micrograms

IRIS = Integrated Risk Information System (TCE data most recently revised September 28, 2011)

⁽¹⁾ Concentration detected in the indoor air (IAS-10).

⁽²⁾ Exposure Concentration = See Equations below

⁽³⁾ Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg

⁽⁴⁾ Kidney Excess Cancer Risk = Mutagenic Exposure Concentration x Inhalation Kidney Mutagenic Unit Risk

⁽⁵⁾ Liver Excess Cancer Risk = Carcinogenic Exposure Concentration x Inhalation Liver Unit Risk

⁽⁶⁾ Total Excess Cancer Risk = Kidney Excess Cancer Risk + Liver Excess Cancer Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/ AT, where:

Mutagenic Exposure Concentration = CA x ET x EF x ((ED2 x AF2)+(ED4 x AF4)) / ATc where:

Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc} where:

CA = Constituent Concentration in Air (estimated) See above (ug/m³)

ET = Exposure Time (hours per day) 24 (hours/day)

EF = Exposure Frequency (days per year) 350 (days/year)

ED = Exposure Duration (years) 6 (years)

ED2 = Exposure Duration 2 (mutagen) 2 (years)

ED4 = Exposure Duration 4 (mutagen) 4 (years)

AF2 = Age-Dependent Adjustment Factor 10

AF4 = Age-Dependent Adjustment Factor 3

AT_{nc} = Averaging Time (Noncarcinogen, hours) 52,560

AT_c = Averaging Time (Carcinogenic, hours) 613,200

Prepared By: SEK 11/18/14

Checked By: LMS 12/15/14

TABLE F.4
Calculations of Risk to Indoor Air Concentrations – (b)(6)
Adult Resident (Current and Future)
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m ³)	Exposure Value Type ⁽¹⁾	Exposure Concentration ⁽²⁾			Toxicity Values			Source	Hazard Quotient ⁽⁴⁾ (Unitless)	Kidney Excess Cancer Risk ⁽⁵⁾ (Unitless)	Liver Excess Cancer Risk ⁽⁶⁾ (Unitless)	Total Excess Cancer Risk ⁽⁷⁾ (Unitless)
			Noncarcinogen (ug/m ³)	Mutagenic ⁽³⁾ (ug/m ³)	Carcinogen (ug/m ³)	Inhalation RfC (mg/m ³)	Inhalation Kidney Mutagenic Unit Risk (ug/m ³) ¹	Inhalation Liver Unit Risk (ug/m ³) ¹					
Trichloroethylene	0.14	Sampled	1.3E-01	1.4E-01	5.0E-02	2.0E-03	1.0E-06	3.1E-06	IRIS	0.07	1.4E-07	1.5E-07	3E-07

Notes:

m = cubic meters

mg = milligram

RfC = Reference Concentration

ug = micrograms

IRIS = Integrated Risk Information System (TCE data most recently revised September 28, 2011)

⁽¹⁾ Concentration detected in the indoor air (IAS-08).

⁽²⁾ Exposure Concentration = See Equations below

⁽³⁾ Mutagenic risk for TCE includes age-adjusted risk for ages 0 to 26 years.

⁽⁴⁾ Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg

⁽⁵⁾ Kidney Excess Cancer Risk = Mutagenic Exposure Concentration x Inhalation Kidney Mutagenic Unit Risk

⁽⁶⁾ Liver Excess Cancer Risk = Carcinogenic Exposure Concentration x Inhalation Liver Unit Risk

⁽⁷⁾ Total Excess Cancer Risk = Kidney Excess Cancer Risk + Liver Excess Cancer Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/ AT, where:

Mutagenic Exposure Concentration = CA x ET x EF x ((ED2 x AF2)+(ED4 x AF4)+(ED10 x AF10)+(ED16 x AF16)) / ATc where:

Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc} where:

CA = Constituent Concentration in Air (estimated) See above (ug/m)

ET = Exposure Time (hours per day) 24 (hours/day)

EF = Exposure Frequency (days per year) 350 (days/year)

ED = Exposure Duration (years) 26 (years)

ED2 = Exposure Duration 2 (mutagen) 2 (years)

ED4 = Exposure Duration 4 (mutagen) 4 (years)

ED10 = Exposure Duration 10 (mutagen) 10 (years)

ED16 = Exposure Duration ≥16 (mutagen) 10 (years)

AF2 = Age-Dependent Adjustment Factor 10

AF4 = Age-Dependent Adjustment Factor 3

AF10 = Age-Dependent Adjustment Factor 3

AF16 = Age-Dependent Adjustment Factor 1

AT_{nc} = Averaging Time (Noncarcinogen, hours) 227,760

AT_c = Averaging Time (Carcinogenic, hours) 613,200

Prepared By: SEK 11/18/14

Checked By: LMS 12/15/14

TABLE F.5
Calculations of Risk to Indoor Air Concentrations – (b)(6)
Child Resident (Current and Future)
Inhalation of Indoor Air

Parameter	Concentration in Air (ug/m ³)	Exposure Value Type ⁽¹⁾	Exposure Concentration ⁽²⁾			Toxicity Values			Source	Hazard Quotient ⁽³⁾ (Unitless)	Kidney Excess Cancer Risk ⁽⁴⁾ (Unitless)	Liver Excess Cancer Risk ⁽⁵⁾ (Unitless)	Total Excess Cancer Risk ⁽⁶⁾ (Unitless)
			Noncarcinogen (ug/m ³)	Mutagenic (ug/m ³)	Carcinogen (ug/m ³)	Inhalation RfC (mg/m ³)	Inhalation Kidney Mutagenic Unit Risk (ug/m ³) ¹	Inhalation Liver Unit Risk (ug/m ³) ¹					
Trichloroethylene	0.14	Sampled	1.3E-01	6.1E-02	1.2E-02	2.0E-03	1.0E-06	3.1E-06	IRIS	0.07	6.1E-08	3.6E-08	1E-07

Notes:

m³ = cubic meters

mg = milligram

RfC = Reference Concentration

ug = micrograms

IRIS = Integrated Risk Information System (TCE data most recently revised September 28, 2011)

⁽¹⁾ Concentration detected in the indoor air (IAS-08).

⁽²⁾ Exposure Concentration = See Equations below

⁽³⁾ Hazard Quotient (Noncarcinogens) = Noncarcinogen Exposure Concentration/RfC x 1000 ug/mg

⁽⁴⁾ Kidney Excess Cancer Risk = Mutagenic Exposure Concentration x Inhalation Kidney Mutagenic Unit Risk

⁽⁵⁾ Liver Excess Cancer Risk = Carcinogenic Exposure Concentration x Inhalation Liver Unit Risk

⁽⁶⁾ Total Excess Cancer Risk = Kidney Excess Cancer Risk + Liver Excess Cancer Risk

Carcinogen Exposure Concentration = CA x ET x EF x ED/AT, where:

Mutagenic Exposure Concentration = CA x ET x EF x ((ED2 x AF2)+(ED4 x AF4)) / ATc where:

Noncarcinogen Exposure Concentration = CA x ET x EF x ED/AT_{nc} where:

CA = Constituent Concentration in Air (estimated) See above (ug/m³)

ET = Exposure Time (hours per day) 24 (hours/day)

EF = Exposure Frequency (days per year) 350 (days/year)

ED = Exposure Duration (years) 6 (years)

ED2 = Exposure Duration 2 (mutagen) 2 (years)

ED4 = Exposure Duration 4 (mutagen) 4 (years)

AF2 = Age-Dependent Adjustment Factor 10

AF4 = Age-Dependent Adjustment Factor 3

AT_{nc} = Averaging Time (Noncarcinogen, hours) 52,560

AT_c = Averaging Time (Carcinogenic, hours) 613,200

Prepared By: SEK 11/18/14

Checked By: LMS 12/15/14

TABLE F.6
Summary of Risk to Indoor Air Concentrations
Adult and Child Residents (Current and Future)
Inhalation of Indoor Air

Location	Adult (a)		Child	
	Hazard Quotient	Excess Cancer Risk	Hazard Quotient	Excess Cancer Risk
(b)(6)	0.1	5E-07	0.1	2E-07
	0.07	3E-07	0.07	1E-07

Note:

(a) Adult excess cancer risk includes mutagenic exposures for multiple ages (TCE).

Prepared By: SEK 11/18/14

Checked By: LMS 12/15/14